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Cooperative Wildlife Research Laboratory
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August 27, 1985

TO: Mr. Carl Becker, Section Manager
Divn. of Forest Resources and Natural Heritage
Illinois Department of Conservation

FROM: Dr. W. D. Klimetz, Director
Cooperative Wildlife Research Laboratory

RE: River Otter Management Plans

As I'm sure you know, the Laboratory was contracted to produce river otter management plans for segments of the Mississippi River north of Alton, Illinois. It is my pleasure to provide this finalized report representing our contribution in accommodating the contract prepared in May 1985. If there are any questions concerning this, please do not hesitate in contacting the Laboratory. Because I will be off campus for a period of time and also because Dr. Alan Woolf was principal supervisor of the project, please direct any questions to him.

Assuming that the Laboratory has met the terms of the contract, it is appropriate that we request payment of \$5,000 as agreed upon. Such payment should be made to the Cooperative Wildlife Research Laboratory, Southern Illinois University at Carbondale and sent to my attention.

It was our pleasure to contribute these management plans. Should any other matters originate that require research/management activities, it would be our pleasure to accommodate such needs.

WDK:ah

Enclosure

cc: Dr. Alan Woolf

FINAL REPORT

River Otter Management Plans

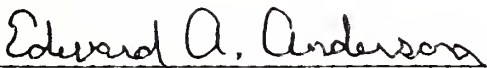
Submitted by CWRL, SIUC

Presented to:

Mr. Carl Becker, Section Manager
Divn. of Forest Resources and Natural Heritage
Illinois Department of Conservation
Springfield, IL 62706

August 27, 1985

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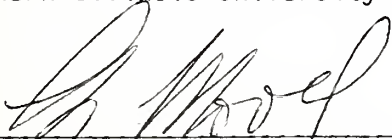


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TABLE OF CONTENTS

	<u>Page</u>
TABLE OF CONTENTS.....	i
LIST OF FIGURES.....	ii
INTRODUCTION.....	1
Status and Distribution.....	1
Habitat Utilization.....	3
Project Objectives.....	5
MATERIALS AND METHODS.....	6
RESULTS AND DISCUSSION.....	7
Management Recommendations.....	7
CONCLUSIONS.....	11
General Recommendations.....	11
Outlook.....	13
LITERATURE CITED.....	14
APPENDICES	
1 Area # 1: Site specific management recommendations.....	17
2 Area # 2: Site specific management recommendations.....	23
3 Area # 3: Site specific management recommendations.....	29
4 Area # 4: Site specific management recommendations.....	35
5 Area # 5: Site specific management recommendations.....	41
6 Area # 6: Site specific management recommendations.....	49
7 Area # 7: Site specific management recommendations.....	55
8 Area # 8: Site specific management recommendations.....	60

TABLE OF CONTENTS (continued)

APPENDICES	<u>Page</u>
9 Area # 9: Site specific management recommendations.....	67
10 Area # 10: Site specific management recommendations.....	74
11 Area # 11: Site specific management recommendations.....	79
12 Area # 12: Site specific management recommendations.....	86
13 Area # 13: Site specific management recommendations.....	90

FIGURES

<u>Figure</u>	<u>Page</u>
1	Proposed distribution of the river otter in Illinois (From Anderson 1982), Wisconsin (From Knudsen 1956), Iowa (From Bowles 1975), Missouri (D. Erickson, pers. commun.), Kentucky, and Indiana.....2
2	Location of 13 areas of critical river otter habitat along the Mississippi River in Illinois, southeastern Iowa, and northeastern Missouri (From Anderson and Woolf 1984).....4
3	Area # 1: Savanna Army Depot; Jo Daviess County, Illinois; Miles 15 Quadrangle.....19
4	Area # 1: Savanna Army Depot; Jo Daviess County, Illinois; Mississippi River miles: 550.2-556.7.....20
5	Area # 2: Green Island Wildlife Management Area; Jackson County, Iowa; Green Island 7.5 Quadrangle.....25
6	Area # 2: Green Island Wildlife Management Area; Jackson County, Iowa; Mississippi River miles: 546.0-548.0.....26
7	Area # 3: Savanna Bay, Rush Creek, Apple River oxbow lakes; Carroll County, Illinois; Blackhawk 7.5 Quadrangle.....31
8	Area # 3: Savanna Bay, Rush Creek, Apple River oxbow lakes; Carroll County, Illinois; Mississippi River miles: 540.0-545.0.....32
9	Area # 4: Spring Lake - Savanna Slough - Plum River; Carroll County, Illinois; Savanna 7.5 Quadrangle.....37
10	Area # 4: Spring Lake - Savanna Slough - Plum River; Carroll County, Illinois; Mississippi River miles: 531.7-537.0.....38
11	Area # 5: Lock and Dam 13 - Johnson Creek - Cattail Slough; Whiteside County, Illinois; Clinton 7.5 and Clinton, NW 7.5 Quadrangles.....43
12	Area # 5: Lock and Dam 13 - Johnson Creek - Cattail Slough; Whiteside County, Illinois; Mississippi River miles: 521.0-523.0.....44
13	River otter intensive study area north of Fulton, Illinois (From Anderson and Woolf 1984).....45

FIGURES (continued)

<u>Figure</u>		<u>Page</u>
14	Area # 6: Meredosia Island - Meredosia Slough; Rock Island and Whiteside counties, Illinois; Clinton 7.5 and Camanche 7.5 Quadrangles.....	51
15	Area # 6: Meredosia Island - Meredosia Slough; Rock Island and Whiteside counties, Illinois; Mississippi River miles 510.0-512.5.....	52
16	Area # 7: Princeton Wildlife Area - Grant and Steamboat sloughs; Scott County, Iowa; Cordova 7.5 Quadrangle.....	57
17	Area # 7: Princeton Wildlife Area - Grant and Steamboat sloughs; Scott County, Iowa; Mississippi River miles: 503.0-506.0.....	58
18	Area # 8: Lock and Dam 14 - Arsenal Island - Rock River mouth; Rock Island County, Illinois and Scott County, Iowa; Mississippi River miles: 476.7-494.0.....	62
19	Area # 8: Lock and Dam 14; Rock Island County, Illinois and Scott County, Iowa; Silvis 7.5 Quadrangle.....	63
20	Area # 8: Arsenal Island; Rock Island County, Illinois; Davenport East 7.5 Quadrangle.....	64
21	Area # 8: Rock River mouth; Rock Island County, Illinois and Scott County, Iowa; Andalusia 7.5 Quadrangle.....	65
22	Area # 9: Lake Odessa - Turkey and Otter islands; Louisa County, Iowa; Toolesboro 7.5 and Wapello 7.5 Quadrangles.....	68
23	Area # 9: Lake Odessa - Turkey and Otter islands; Louisa County, Iowa; Mississippi River miles: 435.0-441.0.....	69
24	Transmitter location points (B-J) for adult male otter M1 in the Lake Odessa and Keithsburg areas, 30 June - 19 December 1983 (From Anderson and Woolf 1984).....	71
25	Area # 10: Keithsburg; Mercer County, Illinois; Joy 7.5 and Keithsburg 7.5 Quadrangles.....	75

FIGURES (continued)

<u>Figure</u>		<u>Page</u>
26	Area # 10: Keithsburg; Mercer County, Illinois; Mississippi River miles: 428.0-431.0.....	76
27	Area # 11: Phelps and Prairie sloughs - Oquawka State Wildlife Refuge - Crystal Lake; Henderson County, Illinois; Mississippi River miles: 405.0- 414.2.....	80
28	Area # 11: Phelps and Prairie sloughs; Henderson County, Illinois; Oquawka 7.5 Quadrangle.....	82
29	Area # 11: Oquawka State Wildlife Refuge; Henderson County, Illinois; Kingston 7.5 Quadrangle.....	83
30	Area # 11: Crystal Lake; Henderson County, Illinois; Burlington 7.5 Quadrangle.....	84
31	Area # 12: Quincy Bay; Adams County, Illinois; Quincy West 7.5 Quadrangle.....	87
32	Area # 12: Quincy Bay; Adams County, Illinois; Mississippi River miles: 328.0-332.0.....	88
33	Area # 13: Dogfish, Ligon, and Birch sloughs; Lincoln County, Missouri; Foley 7.5 and Hardin 7.5 Quadrangles.....	91
34	Area # 13: Dogfish, Ligon, and Birch sloughs; Lincoln County, Missouri; Mississippi River miles: 246.2-250.0.....	92

INTRODUCTION

Status and Distribution

The river otter (Lutra canadensis) is currently listed as a "threatened" species in Illinois. It is recognized that little was known of the status and distribution of the river otter in Illinois when that status was assigned in the "Interim List" of rare, threatened, and endangered species published in 1976 by the Illinois Nature Preserves Commission and the Illinois Department of Conservation (IDOC). In 1977, the Illinois Nature Preserves Commission documented recent records of otter occurrence; and, the Illinois Endangered Species Protection Board officially designated the river otter as State threatened (Thom 1981). Mail surveys of commercial fishermen in 1978 (Hubert 1978) and Illinois Department of Conservation (IDOC) personnel in 1979 (G. F. Hubert Jr., unpubl. data) were made by the IDOC.

The Cooperative Wildlife Research Laboratory (CWRL) during January 1981 - June 1982 reevaluated the current status and distribution of the river otter in Illinois based on unpublished reports, literature, and reports of confiscations (Anderson 1982). Evidence indicates a sporadic occurrence throughout much of Illinois, but, the major portion of the population occurs along the Mississippi River from the Wisconsin border to just north of Rock Island, IL (Fig. 1). A smaller population exists in southern Illinois centered along the Cache River in the Heron Pond - Little Black Slough area.



Figure 1. Proposed distribution of the river otter in Illinois (From Anderson 1982), Wisconsin (From Knudsen 1956), Iowa (From Bowles 1975), Missouri (D. Erickson, pers. Commun.), Kentucky, and Indiana.

Habitat Utilization

Because little was known of the habitat utilization by the remnant population of river otters along the Mississippi River in northwestern Illinois, additional information was needed to provide data upon which to implement research and management programs where appropriate. A study (Anderson and Woolf 1984) was conducted by the CWRL from August 1982 - December 1983 to identify and characterize "critical" areas of river otter habitat along and nearby the Mississippi River in northwestern Illinois; to determine seasonal utilization of an example of such habitat; and to assess potential impacts of the various resource uses on the otter population in these areas. An additional objective was to evaluate what effect, if any, water level fluctuations may have on habitat utilization. Two male otters were livetrapped, each surgically implanted with a radio transmitter, and released. Monitoring of habitat and den selection by these otters using radio telemetry and that of other otters, including a small family group, through field observations identified seasonally the type of areas used. Habitats used by otters had several characteristics in common: (1) isolation from the main channel; (2) riparian habitats of extensive woodlands; (3) good water quality; (4) areas of open water in winter; and (5) presence of suitable den sites. Evaluation of habitats along the Mississippi River bordering Illinois, southeastern Iowa, and northeastern Missouri resulted in identification of 13 areas of critical otter habitat (Fig. 2). Commercial transportation, furbearer trapping, and commercial fishing were all found to negatively impact otters. Also, high water levels during March and April may cause den flooding and therefore adversely effect otter recruitment.

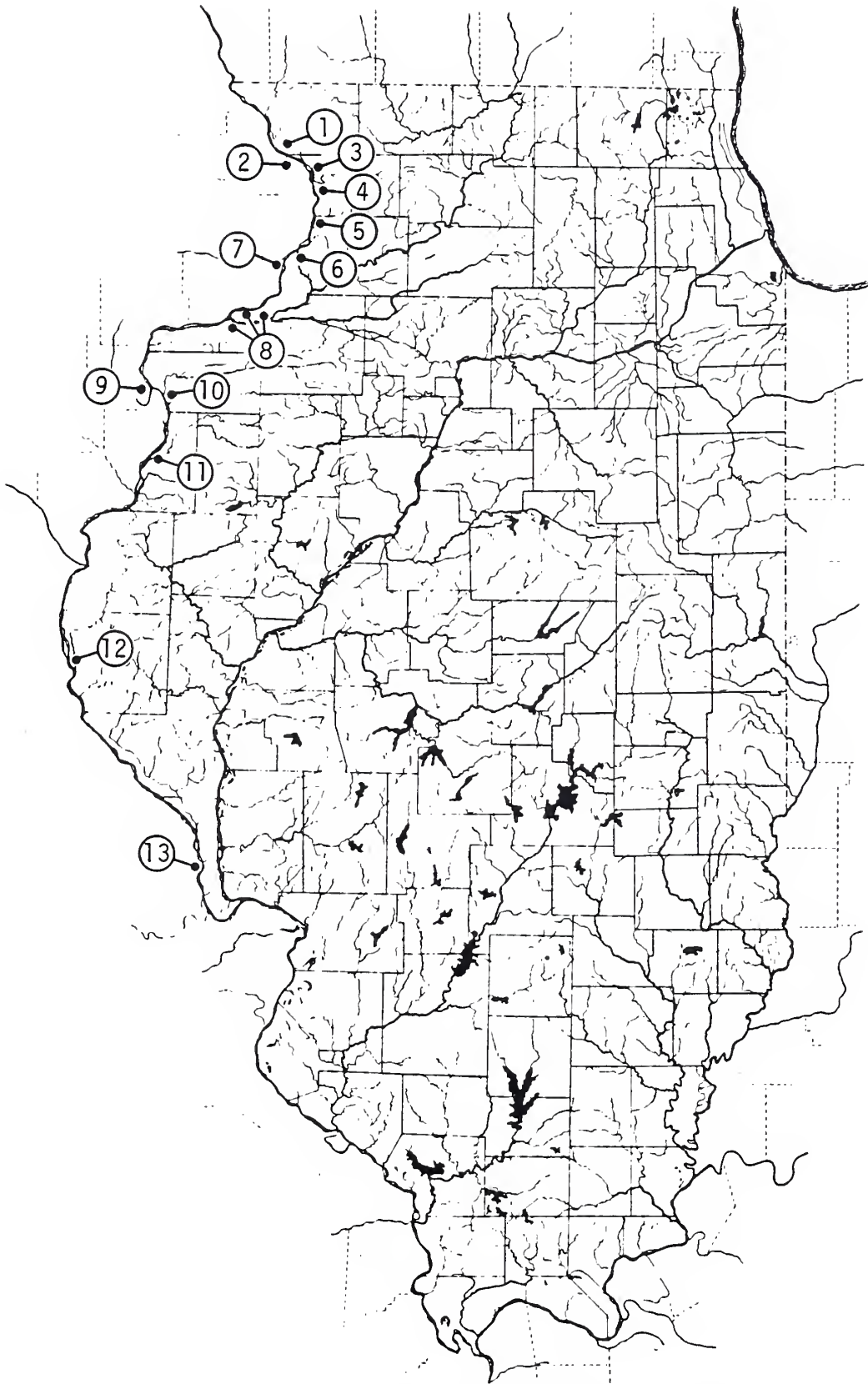


Figure 2. Location of 13 areas of critical river otter habitat along the Mississippi River in Illinois, southeastern Iowa, and northeastern Missouri (From Anderson and Woolf 1984).

General management recommendations provided by Anderson and Woolf (1984) included: (1) preservation and enhancement of existing and potential habitat; (2) establishment of a suitable monitoring system for the river otter in Illinois; (3) restrictions in furbearer trapping regulations and closing of critical areas to provide greater protection for the remnant otter population; and (4) continued information and education programs regarding the river otter's status in Illinois.

Project Objectives

While specific management recommendations were made, specific recommendations relevant to each of the 13 critical areas of otter habitat were not made. The IDOC has been unable to designate personnel and time needed to review and develop management plans for each area. Such plans are needed before discussions with landowners can begin which will have the purpose of promoting implementation of such management. The present investigation involved an effort to develop management plans for each of the 13 important river otter areas, as identified by Anderson and Woolf (1984), including habitat manipulation and recommendations for modification of trapping and commercial fishing regulations.

MATERIALS AND METHODS

Site inspections began 21 June to examine and assess suitability of terrestrial and aquatic habitats in areas of critical habitat identified, but not visited, during previous studies (Anderson 1982, Anderson and Woolf 1984). Habitat assessment included observations of vegetation cover types, water depth and clarity, general abundance of beaver (Castor canadensis) activity, and otter field signs. Criteria for recognition of otter field signs followed Mowbray et al. (1979); additional descriptions were obtained from Grinnel et al. 1937, Greer 1955, Schwartz and Schwartz 1959, Jackson 1961, Erlinge 1967, Park 1971, Murie 1974, and Melquist and Hornocker 1979.

Management recommendations were based on information from previous otter studies (Anderson 1982, Anderson and Woolf 1984), field surveys, and the literature. Area boundaries were indicated on U.S.G.S. topographic maps and U.S. Army Corps of Engineers Mississippi River Navigation Charts (1982). Land ownership was determined from recent county plat books.

RESULTS AND DISCUSSION

Management Recommendations

Specific management recommendations relevant to each of the 13 critical areas of otter habitat are identified by area in Appendices 1-13. These recommendations were developed from research on habitat use (Anderson and Woolf 1984) and included the following general management actions:

1. Preserve existing habitat. Identification of an area as critical habitat for otters (Anderson and Woolf 1984) justifies protection of existing terrestrial and aquatic habitats to maintain the ecological integrity of the areas. Preservation of existing habitat is therefore of primary importance for each site.

2. Deepen lakes, ponds, and sloughs; and construct adjacent log piles. The intensive study area for the previous project, the area immediately below Mississippi River Lock and Dam 13, was identified as an example of suitable otter habitat which was created by unplanned, but effective, habitat improvements as a consequence of levee construction (Anderson and Woolf 1984). Specific habitat enhancements included deepening of lakes and the construction of log piles.

Backwater areas associated with the Mississippi River are characteristically shallow, and are threatened primarily through loss of aquatic environments to sedimentation (Upper Mississippi River Basin Commission 1982). Loss of habitat through silt deposition and its deleterious effect on fish (principal otter prey) and waterfowl have already occurred and been documented along the Illinois River (Mills et al. 1966, Sparks and Starret 1975, Bellrose et al. 1979). Dredging of adjacent bodies of water to obtain material for levee construction can enhance their

potential for use by otters in numerous ways. Deepening of lakes results in a larger, more diverse fish population through an increase in lake volume and habitat diversity thereby providing a larger prey base for otters. Deeper lakes are also less susceptible to winter fish kills frequently suffered by shallow lakes and ponds. Finally, increased lake depths allow suspended sediments to settle out resulting in improved water clarity. Only portions of lakes may need to be dredged as scat evidence indicates otters often forage in shallow littoral areas as well as deeper water around log piles (Anderson and Woolf 1984). An additional benefit of deep water is improved access and fishing opportunities for local sportsmen.

Anderson and Woolf (1984) noted that deposition of trees removed during levee construction into log piles provided ideal den sites for furbearers, including river otters. Further, when placed in shallow water along the edge of lakes and sloughs these piles served as fish attractors and provided quality foraging sites for otters. Radio telemetry work in Idaho by Melquist et al. (1981) revealed extensive otter utilization of log jams for den sites and foraging areas. The importance of log piles, natural and manmade, seems more than a site specific occurrence. Melquist et al. (1981) also noted that otter den selection was related to food availability; suitable den sites were those close to foraging areas. Thus, construction of log piles above normal and high water levels is recommended in areas of critical habitat where suitable den sites are limited.

3. Construct a levee around area. A notable characteristic of preferred otter habitats was isolation from the main channel of the Mississippi River which reduced water level fluctuations and greatly improved water clarity (Anderson and Woolf 1984). Flood damage to wildlife habitat and management facilities is a continuing threat in unprotected

areas and limits management capabilities to provide for wildlife needs. Construction of levees around even small areas of potential habitat is recommended to improve sites for otters and permit management of water levels. However, careful planning is needed to preclude or minimize damage to existing riparian habitats when implementing such enhancement efforts.

4. Identify, survey, and monitor trappers. Due to present and/or potential use of critical areas of habitat by river otters, it is recommended for most areas that trappers utilizing the area be identified, educated in otter sign identification, and discouraged from setting traps where signs are prevalent. Subsequent to the trapping season, a mail survey of these trappers should be conducted to solicit observations of otter signs and identify sites of frequent use by otters. Also, they should be asked to provide harvest information (i.e. species and number taken) to monitor furbearer populations, particularly beaver. A stable beaver population was noted as an indicator of good otter habitat by Goodman (1981).

5. Close area to furbearer trapping. Establishment of "no trapping areas" is recommended and justified in critical areas which have high documented use by river otters, particularly known otter wintering areas (Anderson and Woolf 1984). During late fall and winter, areas of open water provide considerable attraction to otters which will often travel great distances to reach such areas (Erlinge 1967, Park 1971, Bottonff et al. 1976, Goodman 1981). Concentration of otters in limited areas at this time, coinciding with the furbearer trapping season, makes them highly susceptible to accidental captures. Accidental losses to trapping on, and nearby, critical areas of habitat was documented (Anderson and Woolf 1984). Thus, there is an obvious need to prohibit trapping activities in specified

areas posing any threat to the well being of isolated, small, vulnerable
other populations.

CONCLUSIONS

General Recommendations

Whether the river otter survives as a part of the Illinois fauna along the Mississippi River will depend on public interest and the implementation of sound management techniques by the IDOC, Iowa Conservation Commission, U.S. Fish and Wildlife Service, and Army Corps of Engineers. To maintain the otter as a viable part of the fauna of Illinois, a concerted effort must be made by these agencies when making management decisions to preserve and enhance existing habitats for river otters. Current ownership and management of most areas of critical habitat by governmental agencies greatly increases the possibilities and responsibilities for sound management. During land use planning, particular attention should be given to maintenance of riparian habitats so that the integrity of these critical areas is preserved. Public support and cooperation will also be necessary, particularly on private lands.

In addition to specific management recommendations relevant to each area of critical habitat, the following are reiterated and emphasized from Anderson and Woolf (1984):

1. Develop a suitable monitoring system for the river otter. A suitable monitoring system for the river otter, as previously described (Anderson 1982), should be established to permit periodic assessment of it's status. As indicated in this report, there are areas with suitable, but essentially unoccupied, otter habitat along the Mississippi River south of the Quad Cities. Provided these habitats do not deteriorate, otters may repopulate these areas. However, because of very limited patches of suitable habitat along the river through the Quad Cities, and the potential

dispersal barrier created by this situation, natural repopulation may not occur. Sporadic sightings of otters in 41 of 102 Illinois counties since 1950 (Anderson 1982) is evidence of otter mobility; additional evidence is provided by telemetry data (Anderson and Woolf 1984). If such mobility is the norm, reintroductions should not be a priority; it should first be determined why dispersal has not led to population establishment.

Release of otters, particularly adult females, might be considered at some future date if natural repopulation fails to occur. The Lake Odessa and Keithsburg areas, Areas # 9 and 10, respectively, both parts of the National Wildlife Refuge System, could serve as release sites and provide core areas from which reintroduced otters could disperse. Incorporation of a radio telemetry project with any reintroduction is essential to allow monitoring of reintroduction success and provide additional habitat utilization information.

2. Change trapping regulations. Changes in furbearer trapping regulations (Anderson 1982) should be considered, particularly establishment of "no trapping areas" on known otter wintering areas. Banning of conibear land sets such as the "cubby sets" for raccoons must be considered for other areas along the Mississippi River. Alternatively, requiring leg hold traps (less than #3 size) in place of the conibears would permit capture of most raccoons while allowing escape of the larger otters or release of those captured.

3. Monitor losses of river otters to commercial fishing. Commercial fishing on the river otter study area appeared to have no influence on otter habitat selection (Anderson and Woolf 1984). Several times during that study, gill nets were used on Lakes 4 and 5; these nets occasionally stretched across the entire width of the southwest and north ends of Lake 4

with no apparent affect on otter activity. However, several losses to commercial fishing have occurred in recent years near critical areas (e.g. Area # 1: Savanna Army Depot, Area # 9: Lake Odessa - Turkey and Otter islands). In Arkansas, 8.5% of the explained mortality of river otter was attributed to commercial fishing (Polechla and Sealander 1985). Closing of critical areas to commercial fishing does not appear justified at this time; however, the loss of any animals from a remanant population is critical, so, ultimate closing of areas should be considered if losses increase.

Outlook

The river otter population along the Mississippi River in Illinois may be expected to maintain it's current level provided existing habitats are preserved. However, protection alone is not sufficient to preserve these habitats in their present condition as they are threatened through loss of aquatic habitats to sedimentation of backwater areas (UMRBC 1982). Further, projected increases in barge traffic and a corresponding increase in suspended sediment on the Mississippi River may accelerate the loss (UMRBC 1982).

Although habitat protection remains a principal need, opportunities for habitat manipulation and enhancement should not be overlooked. If managment recommendations offered in this report are instituted, the otter population should continue to recover and possibly expand through natural dispersal to unoccupied habitats south of the Quad Cities as far as Gulfport, IL (Area # 11: Crystal Lake). Establishment of a viable population beyond this point is less likely to occur due to deteriorating water quality in the river and a lack of suitable habitat.

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APPENDICES

SITE SPECIFIC MANAGEMENT RECOMMENDATIONS

Appendix 1. Area # 1: Site specific management recommendations.

AREA NAME: Savanna Army Depot (Area # 965: Savanna Army Depot;
Illinois Natural Areas Inventory)

STATE: Illinois

COUNTY: Jo Daviess

LEGAL DESCRIPTION:

SEC 4, SEC 5, EH SEC 8, SEC 9, NWQ & SH SEC 10, NWQ & SH SEC 14, SEC 15,
SEC 16, NEQ SEC 21, SEC 22, SEC 23, SWQ SEC 24, SEC 25, SEC 26,
NH SEC 27, NEQ SEC 35, NH SEC 36, T26N R1E
NWQ SEC 31, T26N R2E

TOPOGRAPHIC QUADRANGLE: Bellevue, IOWA-ILL 7.5
Springbrook, IOWA-ILL 7.5
Green Island, IOWA-ILL 7.5
Miles, IOWA-ILL 15

LAND OWNERSHIP: Public (Federal)

Management: Savanna Army Depot
Savanna, IL 61074

OTTER REPORTS:

<u>Year</u>	<u>Report</u>	<u>Source</u>
1966	Jo Daviess County, IL: otters have been caught by trappers and in fish nets on Apple River north of Elizabeth and on the Mississippi River	Thom, unpubl. data
1975	Jo Daviess County, IL: permanent population in Pool 12 of Mississippi River from Menominee Slough to Savanna Army Depot	Thom, unpubl. data
1980	signs observed on Savanna Army Depot (winter)	Anderson 1982
1981	an otter was accidentally caught by a commercial fisherman in Wise Lake, Mississippi River, 5.0 km north of Savanna Army Depot (June)	Anderson 1982
1982	an otter was trapped along Crooked Slough, 2.0 km north of Savanna Army Depot (December)	Anderson and Woolf 1984

SITE DESCRIPTION:

The Savanna Army Depot contains 5303 ha (13104 acres) including a large area of bottomland on the Mississippi River just below Lock and Dam 12. The bottomland (Figs. 3, 4) consists of extensive backwater sloughs and narrow channels providing much suitable summer habitat for otters. The area was previously identified as significant otter habitat during the Illinois Natural Areas Inventory (IDOC 1978). It provides above average furbearer, waterfowl, and forest wildlife production (Peterson 1984). Bald eagles (Haliaeetus leucocephalus) use the bottomland forest on the depot as a winter roost area, and nesting attempts have been made (IDOC 1978, Dunston and Fawks 1981). Restricted access (hunting and fishing allowed to depot employees, only, and contracted commercial fishing) limits human disturbances and trapping pressure, providing relative seclusion. A site at the southeast end of the area is used for ammunition testing and demolition which generates some disturbances. A forest management plan (1958 Forest Management Plan, Savanna Army Depot) has been developed for the area, and portions of the bottomland are logged. The area is enhanced by the proximity of additional otter habitat to the southeast (Area # 2: Green Island Wildlife Management Area).

MANAGEMENT RECOMMENDATIONS:

1. Protect existing backwater and riparian habitats. Bottomland on the depot presently contains much suitable summer habitat for otters along wooded sloughs and side channels as indicated by past river otter reports from this portion of the Mississippi River. Scarcity of reports from depot land is in part due to minimal human contacts, a result of restricted public access to the area. Protection of existing backwater and riparian habitats in the bottomland is therefore of primary importance. According

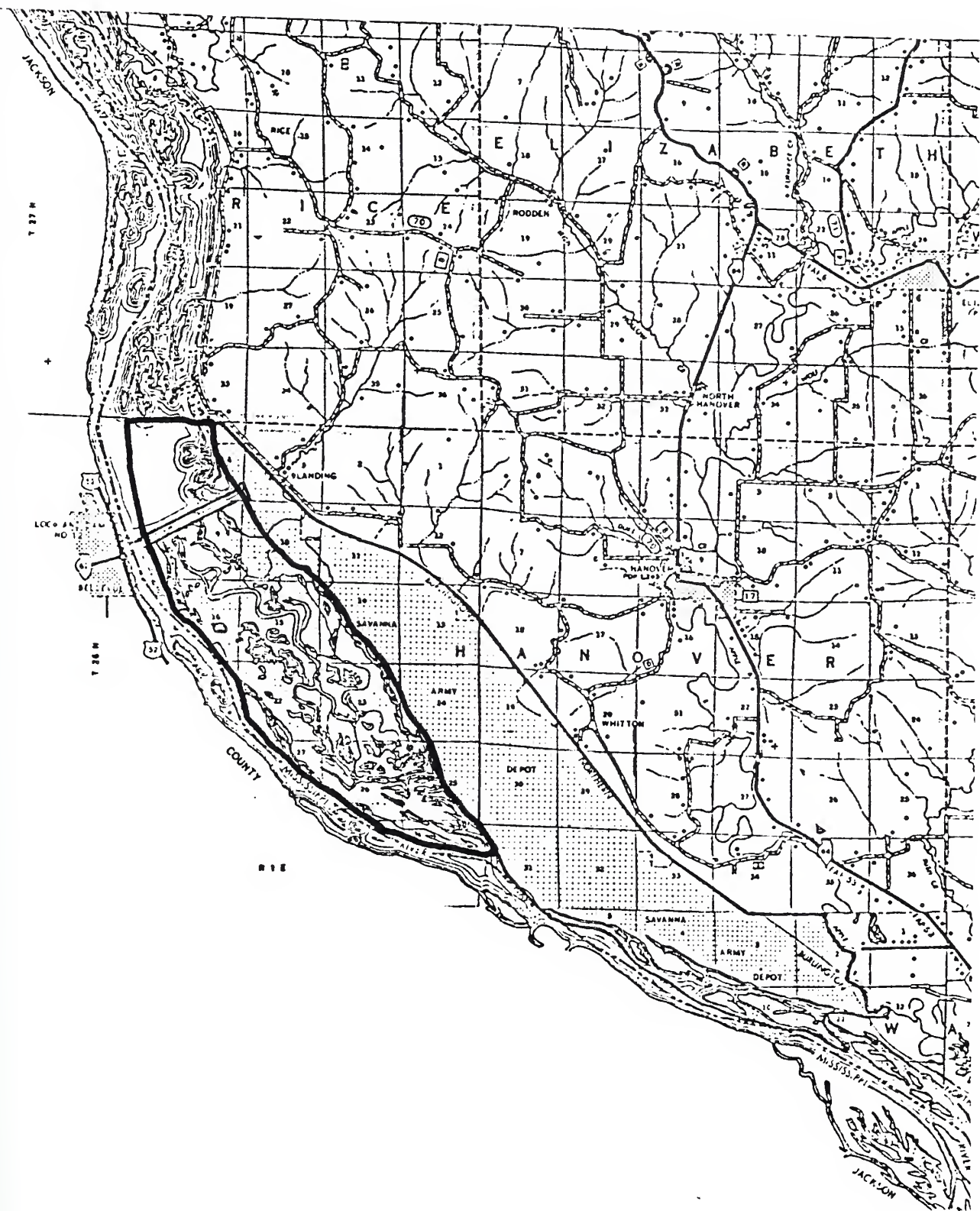


Figure 3. Area # 1: Savannah Army Depot; Jo Daviess County, Illinois; Miles 15 Quadrangle.

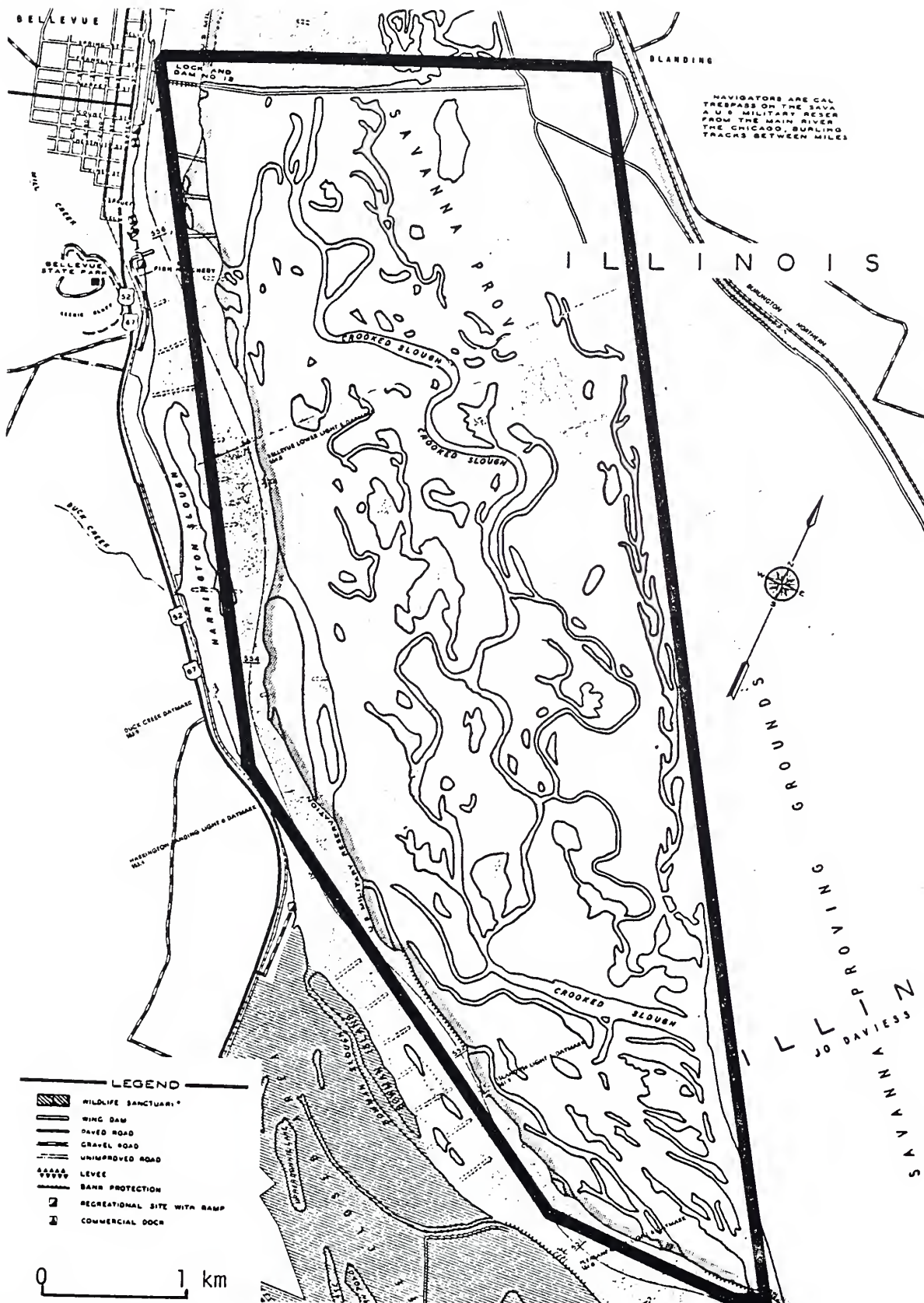


Figure 4. Area # 1: Savanna Army Depot; Jo Daviess County, Illinois; Mississippi River miles: 550.2-556.7.

to Ingram (1978), the 1958 Forest Management Plan for the depot calls for no logging within 46 m (150 feet) of main channels and no logging within 15 m (50 feet) of any sloughs. Such provisions would adequately protect existing habitats. However, Ingram (1978) indicated the plan was not followed in past logging operations, and trees were marked to be cut within 9 m (30 feet) of the main channel and trees immediately adjacent to sloughs were marked to be cut.

2. Survey and monitor depot trappers. Due to restricted access to depot property, area trappers should be identified, if not already known, and required to submit a list of species and numbers harvested in order to monitor furbearer populations, especially beaver. In addition, trappers could be an invaluable source of information concerning river otter activity when properly educated about otter signs.

3. Construct a levee, including water control structures, around the bottomland area. Major problems with this area are water level fluctuations, poor water quality (clarity), and siltation of backwater habitats resulting from direct connection with the Mississippi River. Interior ponds and sloughs are relatively protected from these adverse effects during lower river stages due to their isolation from the main channel. However, if the area is to be managed successfully, a levee, including water control structures, should be constructed along the western and southern borders so that water level management is possible. Such a levee would decrease siltation of backwater areas by limiting influx of silt-laden river waters, thus extending the life of the shallow ponds and sloughs. If feasible under existing Federal regulations, use of depot lakes (e.g. Goose, Jackson, and Golden lakes) as sources for dredged material for levee construction would significantly improve their potential

for use by otters. Use of the western and southern borders as disposal sites for dredged material from channel maintenance would provide additional material for levee construction. Additionally, the levee would provide secure den sites above normal water levels.

4. Deepen interior ponds and lakes (may be done separately or incorporated with No. 3). Winter habitat on the area is limited due to the shallow characteristic of the backwater areas and limited flow through side channels. Deepening, as previously discussed, of several of the larger interior ponds would significantly improve their potential as summer and winter otter habitat.

5. Construct log piles adjacent to backwater areas. Sufficient otter den sites are probably available on the area due to the presence of a resident beaver population and it's associated denning activities. As noted in the 1958 Forest Management Plan, a benefit of the logging operations is the cover provided by slash, hollow tree butts, etc. for wildlife species. Use of this material to construct several log piles adjacent to backwater sloughs and ponds would provide additional den sites for otters and other species, however, such a practice is not allowed under the existing forest management plan in order to keep such material from entering backwaters during flooding. Trees removed during any levee construction project should be placed in piles along the interior of the levee and, ideally, adjacent to backwaters.

Appendix 2. Area # 2: Site specific management recommendations.

AREA NAME: Green Island Wildlife Management Area

STATE: Iowa

COUNTY: Jackson

LEGAL DESCRIPTION:

SEQ SEC 12, NEQ & SH SEC 13, NH SEC 24, T85N R5E
 SH SEC 7, SWQ SEC 8, SEC 16, SEC 17, SEC 18, SEC 19, SEC 20, NH & SWQ
 SEC 21, NWQ SEC 28, NH SEC 29, T85N R6E

TOPOGRAPHIC QUADRANGLE: Green Island, IOWA-ILL 7.5

LAND OWNERSHIP: Public (State; Iowa)

Management: Iowa Conservation Commission
 Wallace State Office Building
 Des Moines, IA 50319

Field Headquarters:
 Maquoketa Wildlife Unit
 R.R. 1
 Green Island, IA 52051

OTTER REPORTS:

<u>Year</u>	<u>Report</u>	<u>Source</u>
1975	Carroll County, IL: permanent population in Pool 13 of Mississippi River, Marcy's Bottoms, Savanna Bay area	Thom, unpubl. data
1980	an otter was sighted along Snag Slough, Green Island Wildlife Management Area	Anderson, unpubl. data
1982	3 otters sighted on McGann Lake, Green Island Wildlife Management Area	Anderson, unpubl. data
	signs of 1 otter observed at inlet of channel to Upper Brown's Lake, IA; Mississippi River mile: 546.1 (February)	Anderson 1982
1985	signs observed at inlet of channel to Upper Brown's Lake (June)	Anderson, unpubl. data

SITE DESCRIPTION:

The Green Island Wildlife Management Area (Figs. 5, 6) contains 1437 ha (3550 acres) of marsh and timberland along the Mississippi River just below the mouth of Maquoketa River. The area is surrounded by a 10-km (6-mile) flood levee that protects it from waters of the Mississippi River. A water control structure located in the northeast corner of the area allows partial control of water levels. The marshes, lakes and sloughs provide excellent summer habitat for river otters; and, reports of recent otter sightings on the area have been made. The inlet to the channel feeding Upper Brown's Lake, located adjacent to the northeast corner of the Green Island area (Fig. 6), was used by an otter in February 1982 (Anderson 1982). A log jam blocked the inlet and appeared to be an important habitat component, providing a quality foraging site. An elevated site, possibly dredged material, on the eastern side of the inlet provides a secure den site used by beavers and otters. An inspection of the Green Island area in June 1985 yielded fresh scats at this location indicating continued use by otters. The Green Island area is enhanced by areas of habitat to the northwest (Pleasant Creek Wildlife Area, Savanna Army Depot) and east (Browns Lake area, Savanna Bay area), however, these areas are not protected by levees.

According to the "Green Island Wildlife Management Area" brochure (Iowa Conservation Commission), recreational use of the area includes hunting, fishing, trapping, canoeing, wildlife observation, and small motor boating. Annual water levels and winter ice conditions determine fish populations, and winter kills occur frequently due to the shallow nature of the area. Furbearer trapping is popular with muskrat (Ondatra zibethicus),

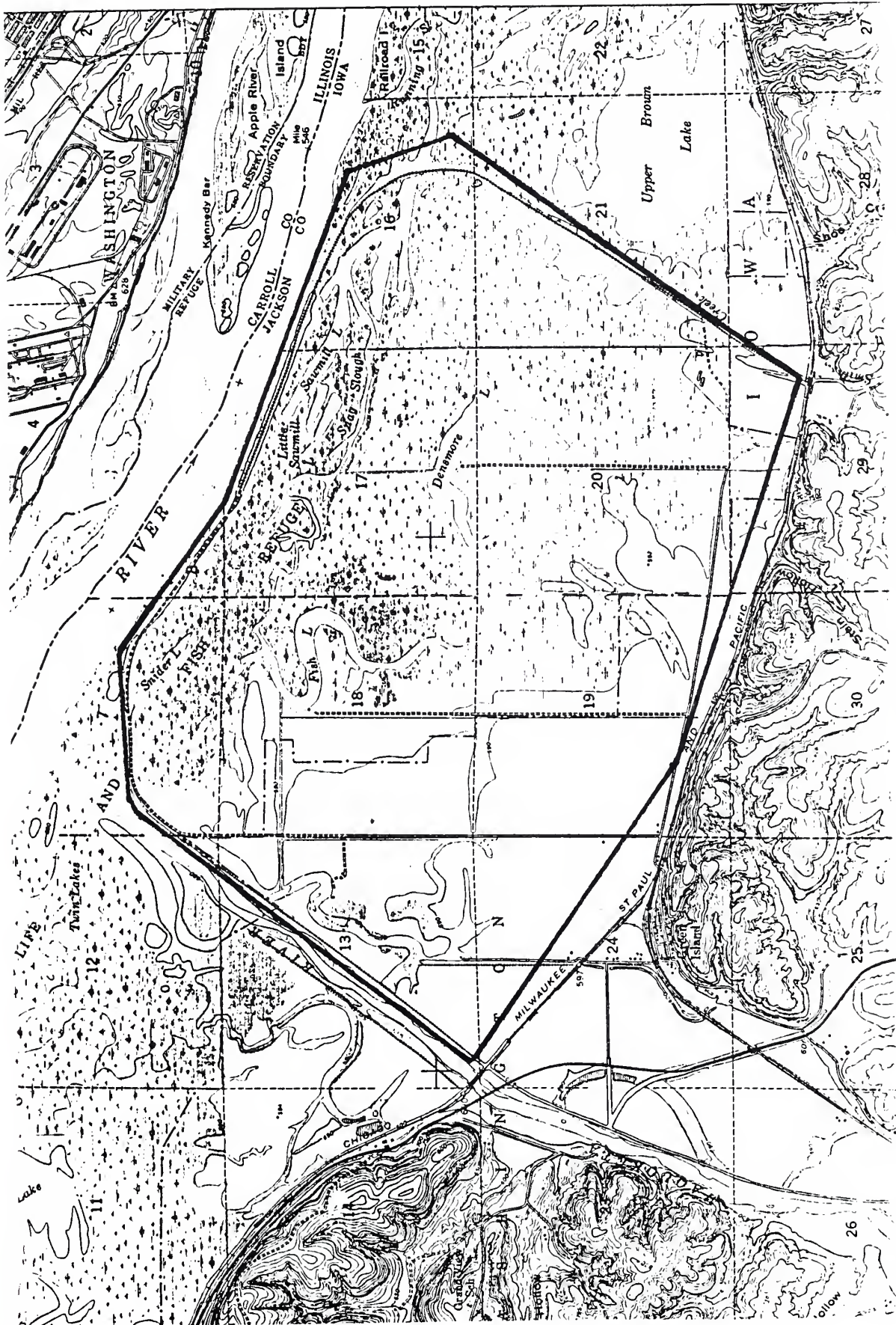


Figure 5. Area # 2: Green Island Wildlife Management Area; Jackson County, Iowa; Green Island 7.5 Quadrangle.

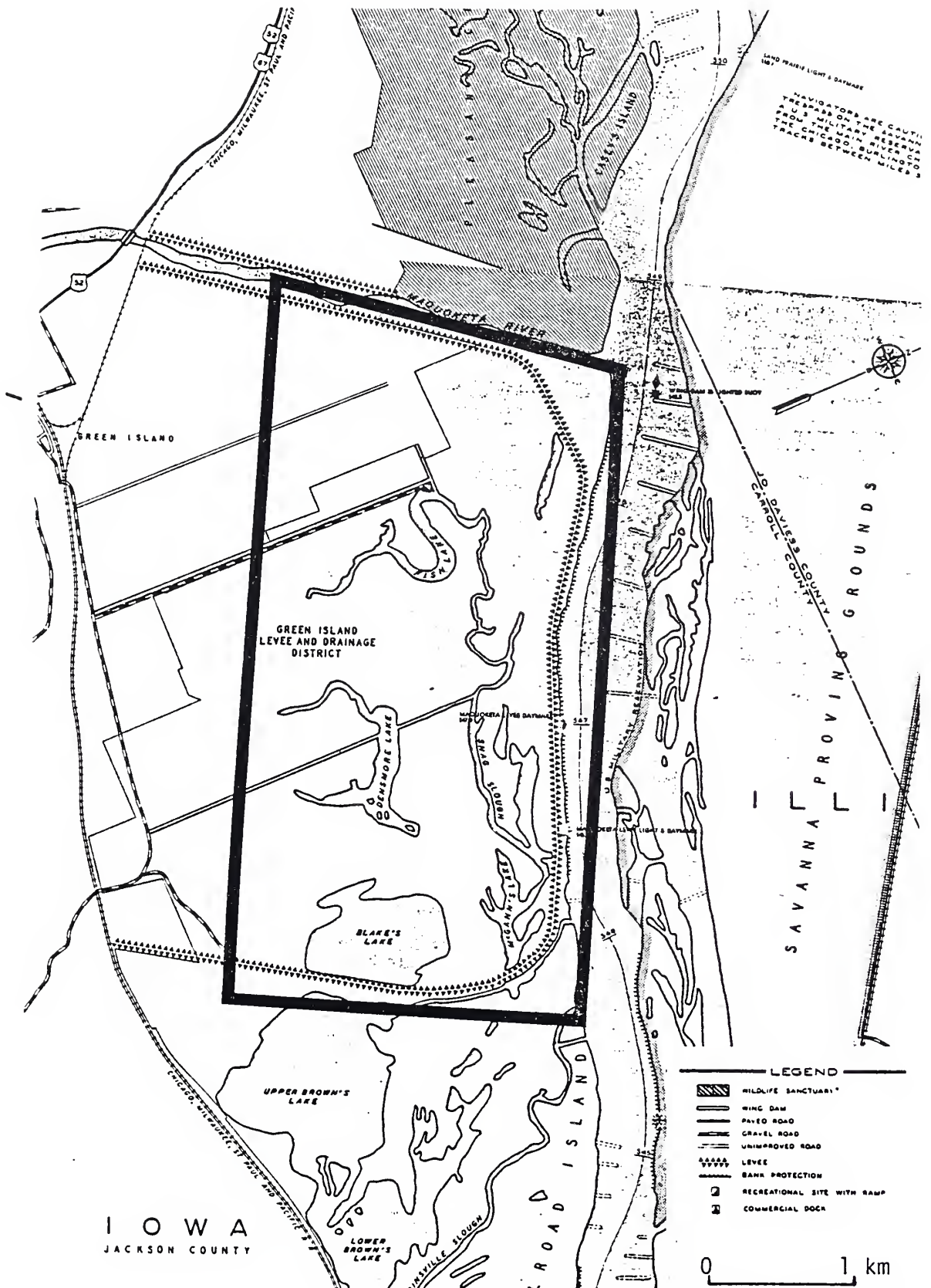


Figure 6. Area # 2: Green Island Wildlife Management Area; Jackson County, Iowa; Mississippi River miles: 546.0-548.0.

mink (Mustela vison), and raccoon (Procyon lotor) the principal target species. The area is closed to trespass 15 September - 15 December.

MANAGEMENT RECOMMENDATIONS

1. Protect existing marshland and backwater habitats. As indicated, the area contains excellent summer habitat for otters. Protection of these habitats is essential and presently accommodated by state ownership and active management by Iowa Conservation Commission personnel. In addition to the Green Island Wildlife Management Area, the area surrounding the inlet to the channel feeding Upper Brown's Lake should receive special protection as the log jam and channel at the inlet point provide quality winter foraging sites, and adjacent beaver bank dens provide suitable otter den sites as evidenced by past and recent utilization.

2. Deepen lakes within levee system. Frequent winter fish kills on the area suggest a major limiting factor for use of the area, particularly in winter. Deepening of portions of several area lakes would help alleviate this problem and enhance their potential for use by otters and fishermen alike. McGann, Sawmill, and Snider lakes (Figs. 5, 6) are recommended sites due to their wooded shorelines, relative isolation, and proximity to the existing levee, the latter providing equipment access with minimal habitat disturbance. Dredged material could be used to reinforce the levee system or to create sections of elevated lake shorelines which would provide secure den sites during periods of high water.

3. Construct log piles adjacent to lakes. Presence of a resident beaver population suggests suitable otter den sites are provided on the area. Construction of log piles adjacent to backwaters is recommended as an enhancement effort. Should dredging of lakes be performed, any trees removed could be utilized for this purpose.

4. Survey and monitor trappers. If not already being done, trappers utilizing the area should be required to report harvest results. Further, they should be informed as to the presence of otters on the area, educated in otter sign identification, and discouraged from setting traps in areas of suspected otter activity. Sites of frequent otter occurrence (e.g. inlet to channel to Upper Brown's Lake) should be closed to trapping.

5. Monitor area use by otters. In addition to a survey of trappers, occasional searches of potential otter habitats should be conducted by site personnel, particularly during periods of snow cover. Such monitoring would provide information on habitat utilization and results of any enhancement efforts implemented.

Appendix 3. Area # 3: Site specific management recommendations.

AREA NAME: Savanna Bay - Rush Creek - Apple River oxbow lakes (Area # 412:
Blackhawk Otter Habitat; Illinois Natural Areas Inventory)

STATE: Illinois

COUNTY: Carroll

LEGAL DESCRIPTION:

SEC 7, SH SEC 17, SEC 18, SEC 19, SEC 20, SWQ SEC 21, WH SEC 28, SEC 29,
NEQ SEC 30, T25N R3E
SEC 12, NEQ SEC 13, T25N R2E

TOPOGRAPHIC QUADRANGLE: Blackhawk, IOWA-ILL 7.5

LAND OWNERSHIP: Public (Federal)

Management: Upper Mississippi River Wildlife
and Fish Refuge
1222 West 2nd Street
Winona, MN 55987

Field Headquarters:
District Refuge Manager
P.O. Box 250
Savanna, IL 61074

Private

Landowners: Henry Airhart
Elmer Airhart
Floyd Niles
Joseph Hatchkiss
F.T. & C.R. Colehour
Ronald D. Hagen
Robert L. Knuth
American National Bank & Trust Co.

OTTER REPORTS:

<u>Year</u>	<u>Report</u>	<u>Source</u>
1970	signs observed several kilometers up Apple River	Thom, unpubl. data
1975	Carroll County, IL: permanent population in Pool 13 of Mississippi River, Marcy's Bottoms, Savanna Bay area	Thom, unpubl. data
1979?	2 otters reportedly trapped along Apple River oxbow lakes (winter)	Anderson, unpubl. data

1981	signs of 1 otter observed at mouth of Rush Creek (August)	Anderson 1982
	signs of 4 otters (female and 3 pups) observed along backwater channel of Mississippi River, river mile 543 (August)	Anderson 1982

SITE DESCRIPTION:

This complex (Figs. 7, 8) possesses a diverse habitat base in backwater lakes and sloughs, marshland, oxbow lakes, and perennial stream habitat. The area was previously identified as otter habitat during the Illinois Natural Areas Inventory (IDOC 1978). It provides above average furbearer, waterfowl, and forest wildlife production (Peterson 1984). Of particular value may be the privately owned oxbow lakes and marshland areas south of Apple River and partially protected by the Burlington Northern Railroad bed from flood waters of the Mississippi River. Railroad overpasses at Apple River and Rush Creek and a 102-cm (40-inch) diameter culvert located in the railroad bed allow water levels in the protected area to fluctuate with the Mississippi River during high river stages. In terms of water clarity, aquatic habitats in these areas are superior to those in unprotected areas south of the railroad; the marshland particularly has excellent water clarity. Suitable otter den sites are probably available due to the presence of a resident beaver population.

MANAGEMENT RECOMMENDATIONS

1. Protect existing riparian and marshland habitats, particularly in areas north of Burlington Northern Railroad. Existing habitats provide suitable habitat for otters as evidenced by past reports of otter utilization. Unconfirmed reports of 2 accidental catches of otters by trappers along the oxbow lakes in winter suggest these lakes may provide winter foraging sites which are scarce along the river. Past observation

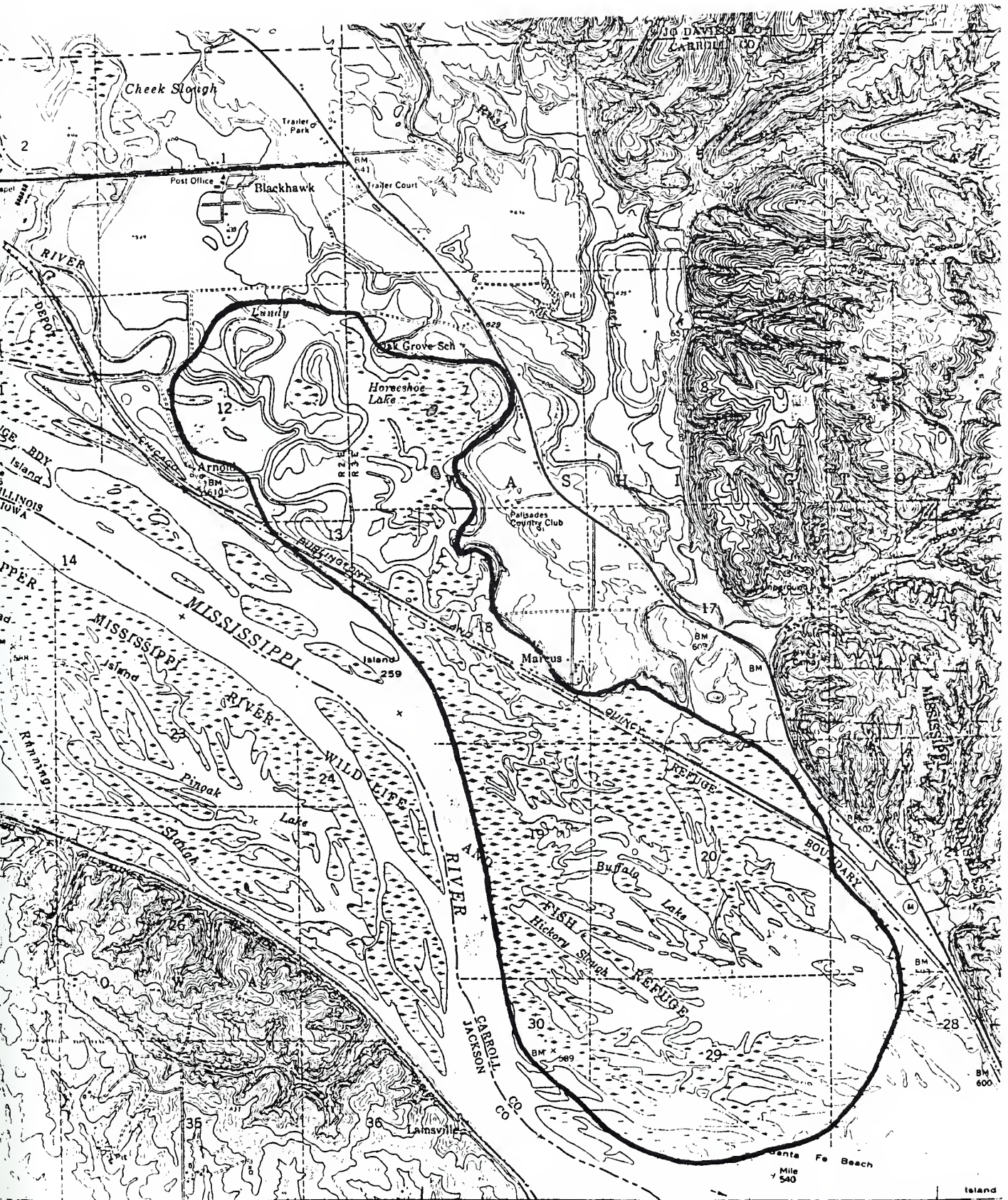


Figure 7. Area # 3: Savanna Bay, Rush Creek, Apple River oxbow lakes; Carroll County, Illinois; Blackhawk 7.5 Quadrangle.

Figure 8. Area # 3: Savanna Bay, Rush Creek, Apple River oxbow lakes; Carroll County, Illinois; Mississippi River miles: 540.0-545.0.

of signs of a family group (female and pups) on the area suggest a potential for otter reproduction on, or nearby, the area. Thus, protection of existing riparian and marshland habitats is essential. Preservation of habitats south of the railroad bed (Figs. 7, 8) is accommodated, as these lands are publicly owned and part of the Upper Mississippi River Wildlife and Fish Refuge. Areas north of the railroad bed are privately owned and situated in a predominately agricultural area. Wooded riparian habitats around several oxbow lakes have been cleared for agriculture and others reduced to thin borders. Remaining wooded borders should be protected from clearing or further development as home sites. The entire area needs protection from drainage projects.

2. Construct a levee, including water control structures, around habitats north of Burlington Northern Railroad, east of Apple River, and west of Marcus. Complex surface hydrology and drainage systems make protection of the entire area difficult, but, the oxbow lakes (Fig. 7) could be enhanced if protected from flood waters. The railroad bed could function as a levee, and existing culvert(s) modified to provide water level control. Due to natural topography, no levee may be required from Marcus north to Route 84. A levee would be needed along the western edge of the area to provide protection from the Apple River; the road leading to Arnold could serve as foundation for this levee.

Marsh habitats adjacent to Rush Creek and north of the railroad bed (Fig. 7) are seasonally inundated, but protection of these areas is not essential as they presently provide suitable summer habitat. Water clarity is especially good in the marsh east of Rush Creek during low river and creek stages.

3. Identify, survey, and monitor trappers. Trappers utilizing the area, particularly private lands, should be identified. These individuals should be educated as to otter signs and encouraged to avoid areas where otter sign is prevalent. They should be asked to provide harvest information, i.e. species and number taken, and surveyed as to observations of otter signs. Ultimate closing of the area to trapping is recommended if habitat enhancement is performed.

Appendix 4. Area # 4: Site specific management recommendations.

AREA NAME: Spring Lake - Savanna Slough - Plum River

STATE: Illinois

COUNTY: Carroll

LEGAL DESCRIPTION:

SEQ SEC 9, SH SEC 10, SWQ SEC 11, WH SEC 14, SEC 15, SEC 16, EH SEC 21,
SEC 22, SEC 23, SEC 26, SEC 27, EH SEC 28, SEC 34, SEC 35, T24N R3E

TOPOGRAPHIC QUADRANGLE: Savanna, ILL-IOWA 7.5
Savanna, ILL-IOWA 15

LAND OWNERSHIP: Public (Federal)

Management: Upper Mississippi River Wildlife
and Fish Refuge
1222 West 2nd Street
Winona, MN 55987

Field Headquarters:
District Refuge Manager
P.O. Box 250
Savanna, IL 61074

OTTER REPORTS:

<u>Year</u>	<u>Report</u>	<u>Source</u>
1957	an otter was trapped north of Spring Lake	Anderson, unpubl. data
1970	signs observed up to 6.4 km from mouth of Plum River	Thom, unpubl. data
	yearly reports of sightings at Spring Lake Refuge south of Savanna during 1970's	Thom, unpubl. data
	otters sighted and some caught by trappers on Plum River and between Mississippi River and Rt. 84	Thom, unpubl. data
1975	Whiteside County, IL: permanent population in Pool 13 of Mississippi River, Marcy's Bottoms, Savanna Bay area	Thom, unpubl. data
1980	signs observed on Spring Lake	Anderson 1982
1981	signs of 1 otter observed 2.0 km up Plum River (August)	Anderson 1982

1982	signs of several otters observed along Savanna Slough (February)	Anderson 1982
1983	signs observed along Savanna Slough and Spring Lake (winter)	Anderson, unpubl. data
1984	signs observed along Savanna Slough and Spring Lake (January-April)	Anderson, unpubl. data

SITE DESCRIPTION:

The Spring Lake - Savanna Slough - Plum River area (Figs. 9, 10) located just south of Savanna, IL contains a diverse habitat base providing excellent otter habitat in all seasons. Activities of the resident beaver population supply adequate otter den sites throughout the area. The area is enhanced by a major wetland and backwater complex to the northwest (i.e. Kellers Island Area, IA). Annual aquatic vegetation in shallow waters of that area provide for exceptionally high furbearer production (Peterson 1984). Spring Lake was completely protected by a levee until 1969 when flood waters from the Mississippi River destroyed portions of the eastern and southern sections. The Upper Unit, a waterfowl management area, was created when a levee was constructed across the northern portion of Spring Lake (note: this levee does not appear in Figs. 9, 10). Water control structures located in the western and southeastern levee sections provide partial control of water levels. The Upper Unit supports dense stands of marsh vegetation, primarily cattails (Typha spp.), arrowleaf (Sagittaria spp.), and rice cut-grass (Leersia oryzoides), with scattered areas of open water and woodlands providing excellent otter habitat in spring, summer, and fall. Water clarity is particularly good in this area, and the levee and woodlands provide secure den sites. Otter signs are frequently found on the levee along trails used by otters to travel to adjacent habitats along Savanna Slough and Plum River. Spring Lake is a wildlife sanctuary

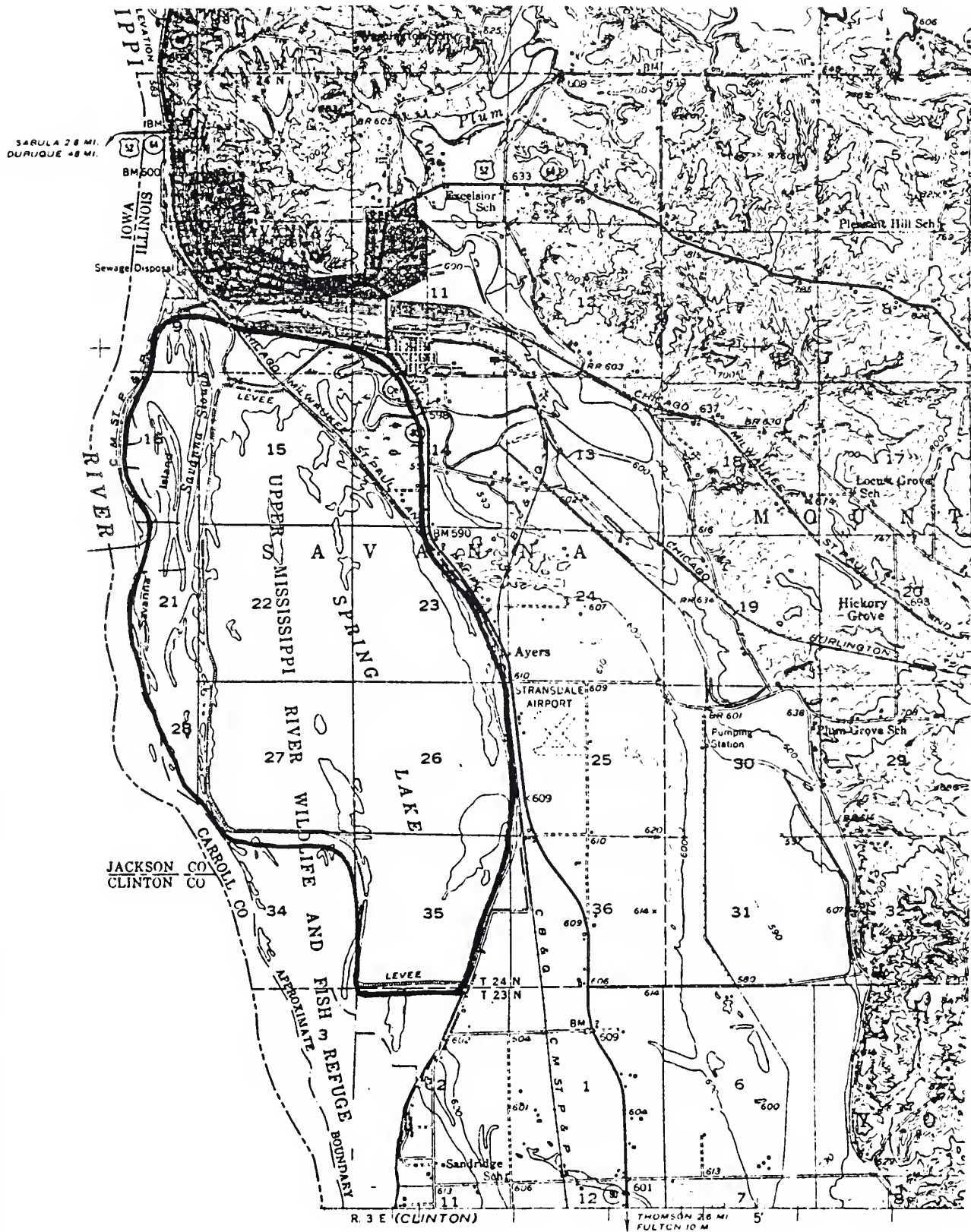


Figure 9. Area # 4: Spring Lake - Savanna Slough - Plum River; Carroll County, Illinois; Savanna 7.5 Quadrangle.

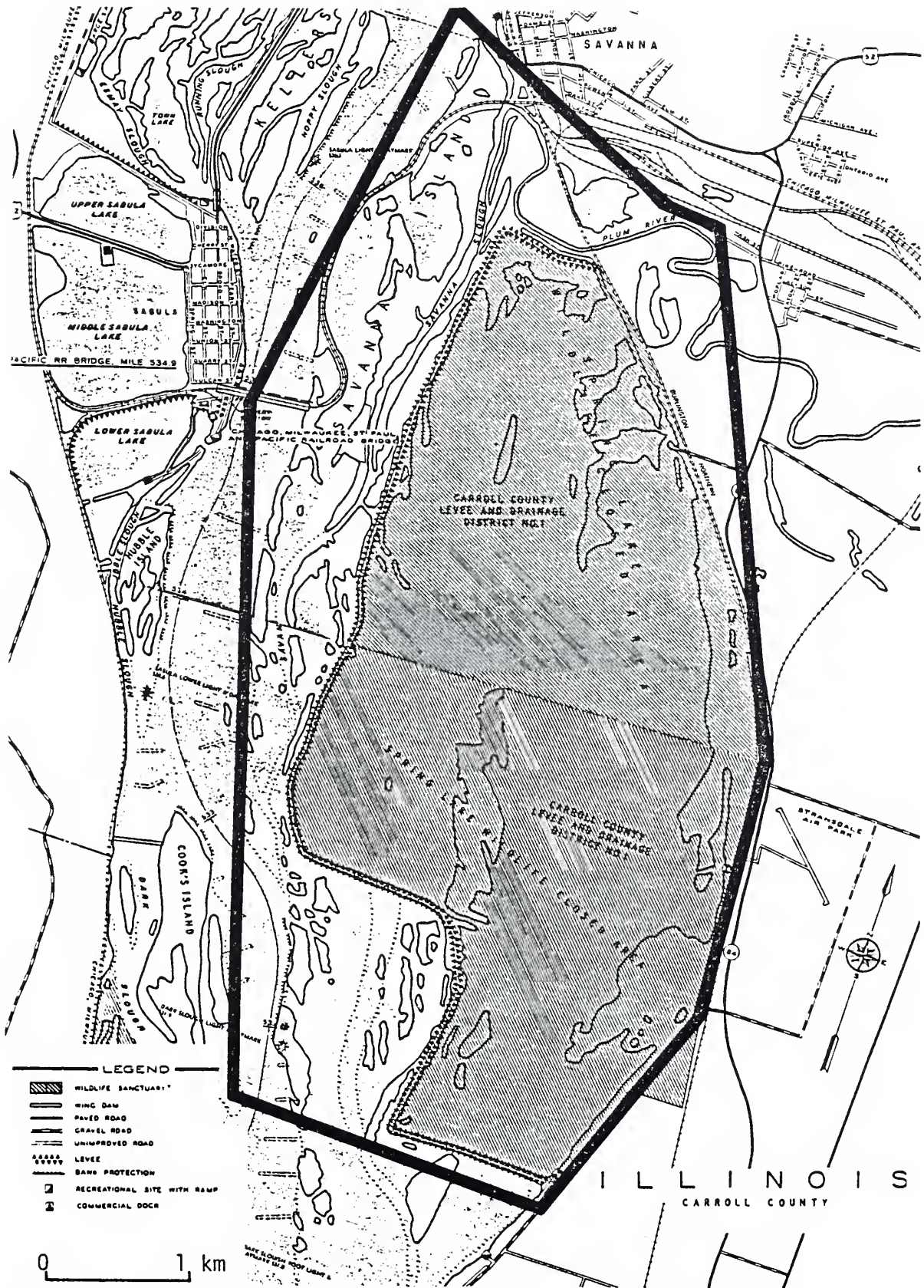


Figure 10. Area # 4: Spring Lake - Savanna Slough - Plum River; Carroll County, Illinois; Mississippi River miles: 531.7-537.0.

(Fig. 10), and closed to all trespass October 1 through last day of Illinois duck season, thus providing much seclusion for otters utilizing the area.

Savanna Slough (Figs. 9, 10) contains considerable open water and good water clarity during normal winters providing an extensive and quality foraging area. During the severe winter of 1982, the area contained no open water, however, a site along the slough was occupied by 3 otters which were able to forage beneath the ice due to sufficient water flow. In February 1983, otter signs were found along most of the slough as the entire length remained open.

Plum River and it's backwaters (Figs. 9, 10) are subject to seasonal flooding, but provide suitable otter habitat at other times. Water clarity is poor due to turbidity but improves with winter ice cover.

MANAGEMENT RECOMMENDATIONS:

1. Protect existing riparian and marshland habitats. The Spring Lake - Savanna Slough - Plum River area has been the site of numerous otter reports and accidental catches by trappers suggesting considerable otter utilization in recent years. Preservation of existing habitat is therefore essential, and presently accommodated by public ownership and active management by U.S. Fish and Wildlife Service personnel. Management of the Upper Unit of Spring Lake for waterfowl is both beneficial for otters and compatible with their habitat management.

2. Repair breaks and install water control structures in levee on Lower Unit of Spring Lake. The Lower Unit of Spring Lake currently provides limited otter habitat, suffering from poor water clarity and water level fluctuations due to direct connection with the Mississippi River. Repair of the 2 major breaks in the levee and reinforcement of other portions would greatly enhance the area and create a significant amount of

suitable otter habitat. The unit receives some otter utilization, primarily in late summer and fall, along the northwestern section of the levee. Ideally, material to make levee repairs should be dredged from inside the existing levee system, thereby creating deep water areas. Trees removed to facilitate levee repairs and maintenance should be placed in piles along the inside of the levee adjacent to these sites to provide foraging and denning sites for otters.

3. Close Savanna Slough, Spring Lake, and lower Plum River to furbearer trapping. The presence of extensive areas of open water in winter along Savanna Slough provides significant attraction to otters using Spring Lake and nearby areas. During late fall and winter, otter activity is centered around these areas making the otters highly susceptible to accidental catches by trappers using the area. Closing Savanna Slough and the Plum River area below Route 84 is recommended.

Appendix 5. Area # 5: Site specific management recommendations.

AREA NAME: Lock and Dam 13 - Johnson Creek - Cattail Slough

STATE: Illinois

COUNTY: Whiteside

LEGAL DESCRIPTION:

SEC 15, EH SEC 16, NH SEC 21, WH SEC 22, WH SEC 26, SEC 27, T22N R3E

TOPOGRAPHIC QUADRANGLE: Clinton, NW, IOWA-ILL 7.5
 Clinton, IOWA-ILL 7.5
 Clinton, IOWA-ILL 15

LAND OWNERSHIP: Public (Federal)

Management: Upper Mississippi River Wildlife
 and Fish Refuge
 1222 West 2nd Street
 Winona, MN 55987

Field Headquarters:
 District Refuge Manager
 P.O. Box 250
 Savanna, IL 61074

Rock Island District, Corps of Engineers
 Clock Tower Building
 Rock Island, IL 61202

Private

Landowners: Jas. B. Balk
 Marvin Flikkema
 Charles Jacobs
 Jos. Keegan
 Henry E. Legel
 Ralph S. Turner
 City of Fulton

OTTER REPORTS:

<u>Year</u>	<u>Report</u>	<u>Source</u>
1963	an otter was trapped at the mouth of Johnson Creek, 0.8 km below Lock and Dam 13 on the Mississippi River	Thom, unpubl. data
1972	a specimen of a river otter came from 4.8 km east of Fulton on Cattail Creek	Thom, unpubl. data

1976	2 or 3 otters reportedly taken by trappers in ditches east of junction of Rts. 84 and 30	Thom, unpubl. data
	Whiteside County, IL: otters have been present along the Mississippi River in this county for at least 20 years	Thom, unpubl. data
	Whiteside County, IL: one report of otter sighting and two reports of sign observations by commercial fishermen	Hubert 1978
1980	2 otters sighted on a lake (Lake 4), 1.0 km northeast of Fulton, IL (winter)	Anderson 1982
1981	sighting on Potter's Marsh South (September)	Anderson 1982
	6 otters sighted on Cattail Slough, 2.0 km east of Fulton, IL (October)	Anderson 1982
	5 otters sighted on a lake (Lake 4), 1.0 km northeast of Fulton, IL (November)	Anderson 1982
	an otter was caught by a trapper on a lake (Lake 4), 1.0 km northeast of Fulton (December)	Anderson 1982
1982	signs of several otters observed along Johnson Creek and on lakes below Mississippi River Lock and Dam 13	Anderson 1982
	an otter was caught by a trapper on a lake (Lake 3) 1.0 km northeast of Fulton (November)	Anderson and Woolf 1984
1983-1984	signs of several otters observed along Johnson Creek and on lakes below Mississippi River Lock and Dam 13	Anderson, unpubl. data
1984	signs observed on Cattail Slough, 2.0 km east of Fulton, IL (May-June)	Anderson, unpubl. data

SITE DESCRIPTION:

The Lock and Dam 13 - Johnson Creek - Cattail Slough area (Figs. 11, 12) contains marshes, shallow and deep backwater lakes, a perennial stream, and timberland located immediately below Lock and Dam 13 and north and west of Fulton, IL. A portion of the area (Fig. 13) was selected for intensive study during previous river otter projects (Anderson 1982, Anderson and

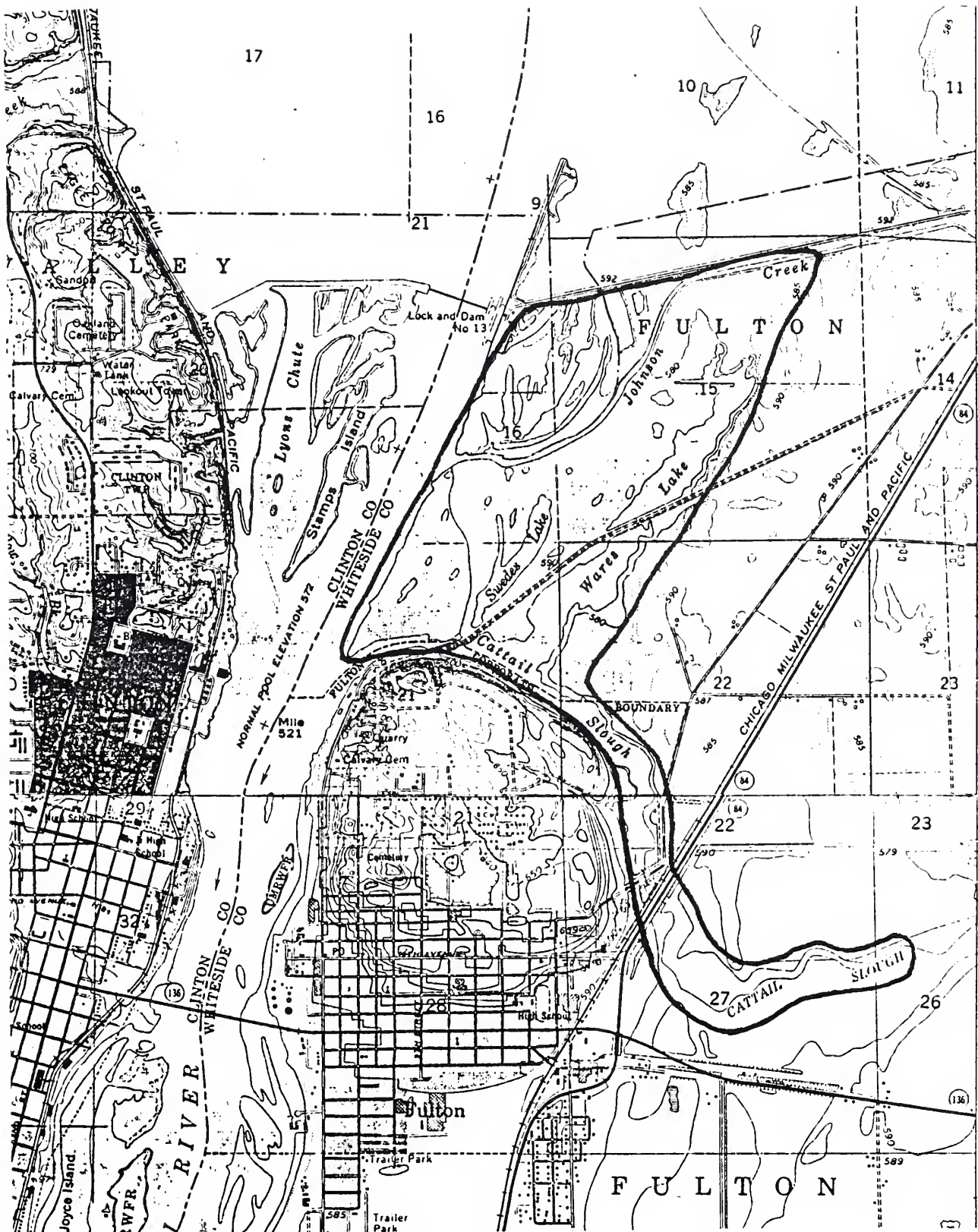


Figure 11. Area # 5: Lock and Dam 13 - Johnson Creek - Cattail Slough; Whiteside County, Illinois; Clinton 7.5 and Clinton, NW 7.5 Quadrangles.

Figure 12. Area # 5: Lock and Dam 13 - Johnson Creek - Cattail Slough; Whiteside County, Illinois; Mississippi River miles: 521.0-523.0.

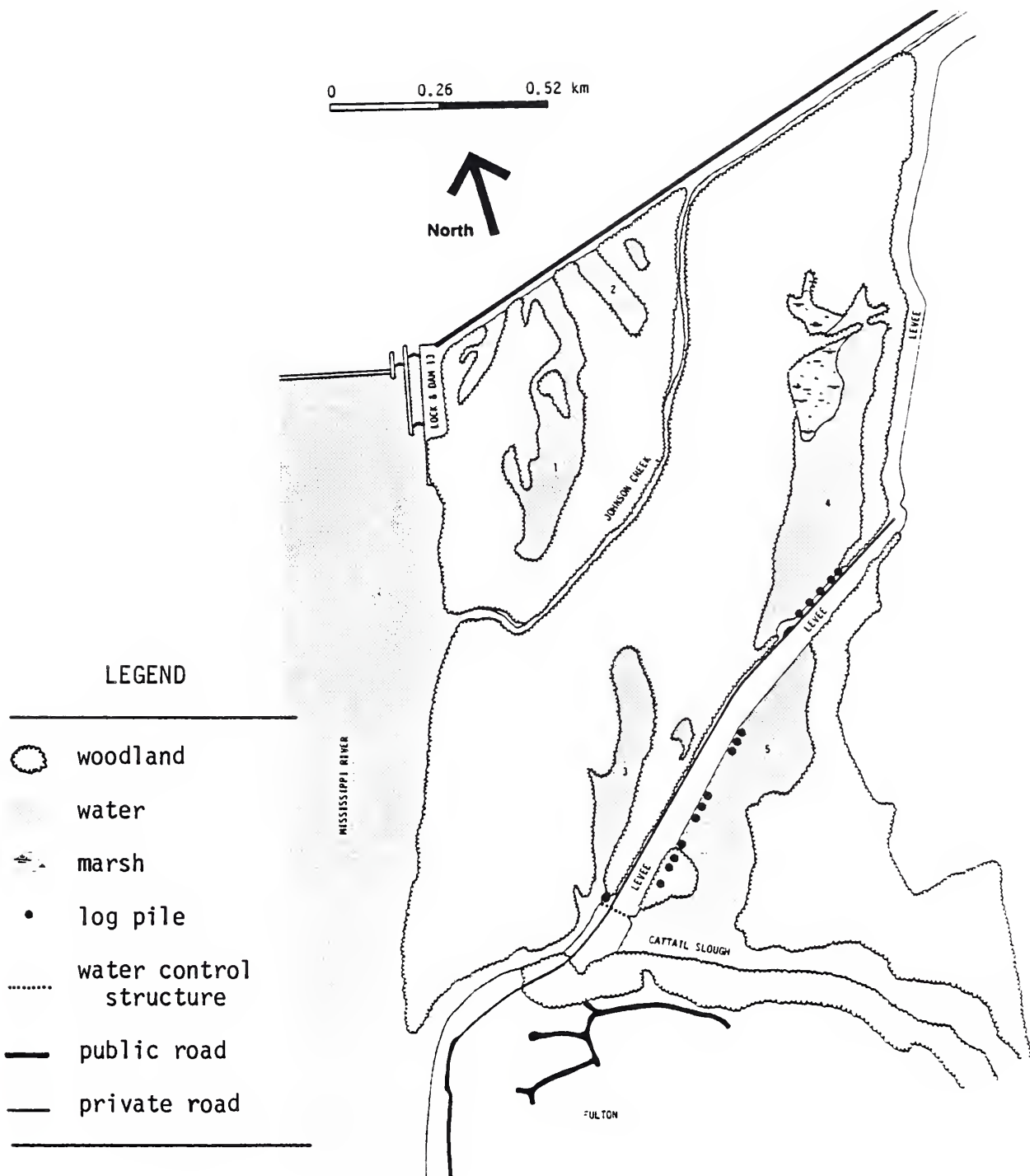


Figure 13. River otter intensive study area north of Fulton, Illinois (From Anderson and Woolf 1984).

Woolf 1984). Prior to 1962, Lake 4 was a narrow ditch draining farmland to the east. The landowner excavated land bordering the ditch in 1962 creating the shallow (about 1 m or less) lake and the existing shoreline. In 1976, a 4 year project was begun to construct a levee through the area as part of a Mississippi River flood control project. Portions of Lakes 3, 4, and 5 were used as borrow pits creating present maximum lake depths of 4.3, 9.1, and 7.0 m for Lakes 3, 4, and 5, respectively. Lakes 1 and 2 remained shallow (maximum 1 m depths). Johnson Creek has water depths of about 0.25 m along all but the lower 1.0 km, and is a rather sterile stream having primarily a sand/silt bottom.

The southern extension of the levee (Fig. 13) utilized an abandoned railroad bed as the foundation. Bordering mixed hardwood trees, some averaging more the 6 m in height, were cut and placed into large piles (8-12 m wide) along the lake shore (Fig. 13). The area is now primarily mixed lowland hardwoods, principally silver maples (Acer saccharinum) and scattered cottonwoods (Populus deltoides).

North and west of the levee is largely in the upper Mississippi River Wildlife and Fish Refuge; the remainder is privately owned. The area receives moderate hunting pressure for waterfowl and white-tailed deer (Odocoileus virginianus). All refuge land is open to trapping with raccoon (Procyon lotor) the principal target species. Commercial fishing occurs in Lakes 3-5 while all lakes receive moderate recreational fishing pressure.

In addition to the intensive study area, Cattail Slough (Fig. 11) originates in the bottomlands east of Fulton, flowing into Wares Lake (Lake 5) from the south. Much of the original slough is gone, but remnants remain as shallow backwater sloughs and marshes radiating from the lower stretch of a drainage ditch constructed through the area.

MANAGEMENT RECOMMENDATIONS:

1. Preserve existing riparian and marsh habitats. As documented (Anderson 1982, Anderson and Woolf 1984), this area has received considerable otter utilization in recent years and contains excellent otter habitat due to habitat improvements as a consequence of levee construction. Preservation of habitats north of the levee is accommodated by public ownership and management by the U.S. Fish and Wildlife Service. Habitats south of the levee are privately owned and in need of protection. In particular, Cattail Slough east of Route 84 is threatened by further drainage projects and clearing for agriculture.

2. Maintain existing log piles. Some maintenance of the log piles may be needed to preserve these important habitat components. During seasonal flooding, logs in the piles float to the surface of inundating water, then settle again as flood waters recede. Continued shifting and loss of logs will in time degrade the suitability of these piles for use by otters. In the future, addition of logs may be needed to preserve these piles.

During levee construction, portions of some piles were covered by dredged material which now supports herbaceous vegetation and even saplings. This process appeared beneficial to otters as evidenced by selection of these log piles as preferred den sites. Flooding and rainfall has caused some dredged material to settle among the logs or be lost into the lakes. Addition of top soil to portions of log piles is recommended to replace that lost, and to prevent the logs from shifting during floods. Soil should be seeded to grasses to reduce erosion.

3. Close area to furbearer trapping. The Lock and Dam 13 area provides considerable attraction to otters during late fall and winter,

coinciding with the furbearer trapping season. Two otters have been caught in traps in recent years. To prevent additional losses, the study area below Lock and Dam 13 and east of Route 84 should be closed to trapping.

4. Restore marsh habitats of Cattail Slough. As indicated, only remnants of the original slough remain. Restoration of marsh and bottomland woods habitat along lower Cattail Slough east of Route 84 is recommended to provide additional habitat for otters. Establishment of a "green corridor" bordering the drainage ditch would enhance and supplement existing habitat and improve water quality. Landowner - state agreements should be developed or the land purchased by the state to accommodate habitat restoration and/or maintenance.

Appendix 6. Area # 6: Site specific management recommendations.

AREA NAME: Meredosia Island - Meredosia Slough (Area # 873: Meredosia Island Otter Habitat; Illinois Natural Areas Inventory)

STATE: Illinois

COUNTY: Rock Island, Whiteside

LEGAL DESCRIPTION:

SEC 26, SEQ SEC 27, NH & SEQ SEC 34, SEC 35, T21N R2E
WH SEC 2, EH SEC 3, SEC 11, SEC 14, T20N R2E

TOPOGRAPHIC QUADRANGLE: Clinton, IOWA-ILL 7.5
Camanche, IOWA-ILL 7.5
Erie, NW, ILL 7.5
Cordova, ILL-IOWA 7.5
Clinton, IOWA-ILL 15
Erie, ILL 15

LAND OWNERSHIP: Public (Federal) - Meredosia Island

Management: Upper Mississippi River Wildlife
and Fish Refuge
1222 West 2nd Street
Winona, MN 55987

Field Headquarters:
District Refuge Manager
P.O. Box 250
Savanna, IL 61074

Private

Landowners:	Gatha Breeden	Mrs. Walter McMahon
	Keith Covell	Dan McNeal
	Roy DeBlieck	Alfred Miller
	Thomas Enright	Lewis E. Newendyke
	Roland Gabriel	Fred H. Schmacher
	Martha George	Harold Smith
	John Mathews	Marcel Van Acker
	August Matton	Lewis Wilson

OTTER REPORTS:

<u>Year</u>	<u>Report</u>	<u>Source</u>
1972	an otter was found dead on Route 84 at junction of Meredosia Ditch, 3.2 km south of Albany, IL (November)	Thom, unpubl. data

1975	permanent population in Pool 14, Meredosia Island area, of Mississippi River	Thom, unpubl. data
1976	Whiteside County, IL: otters have been present along the Mississippi River in this county for at least 20 years	Thom, unpubl. data
	Whiteside Co., IL: one report of otter sighting and two reports of sign observations by commercial fishermen	Hubert 1978
1981	signs of 3 otters observed on Beaver Island, 3.2 km north of Meredosia Island (June)	Anderson 1982
1982	signs observed along Meredosia Island (winter)	Anderson 1982
1983	an otter was found dead on Route 84 at junction of Meredosia Ditch, 3.2 km south of Albany, IL (April)	Anderson and Woolf 1984

SITE DESCRIPTION:

Meredosia Island and it's associated backwaters (Figs. 14, 15) located about 3 km south of Albany, IL on the Mississippi River provides limited summer habitat for otters; however, based on unconfirmed reports, it may be significant as winter habitat. The island was not included in the 1982 helicopter survey of the upper Mississippi River, so, winter habitat conditions are unknown. However, sufficient water flow through side channels may provide open water and suitable otter foraging areas. During other seasons, water level fluctuations and turbidity limit utilization.

Meredosia Slough originates in the Meredosia Bottoms southwest of Albany, flowing into the Mississippi River at Meredosia Island (Figs. 14, 15). At this point, it is separated from the river by a flood control levee; a pumping station provides additional water level control on the slough. The levee provides protection from flood waters and enhances habitats along the slough for otter utilization. Most of the original slough has been drained and converted to cropland, but remnants remain as

Figure 14. Area # 6: Meredosia Island - Meredosia Slough; Rock Island and Whiteside counties, Illinois; Clinton 7.5 and Camanche 7.5 Quadrangles.

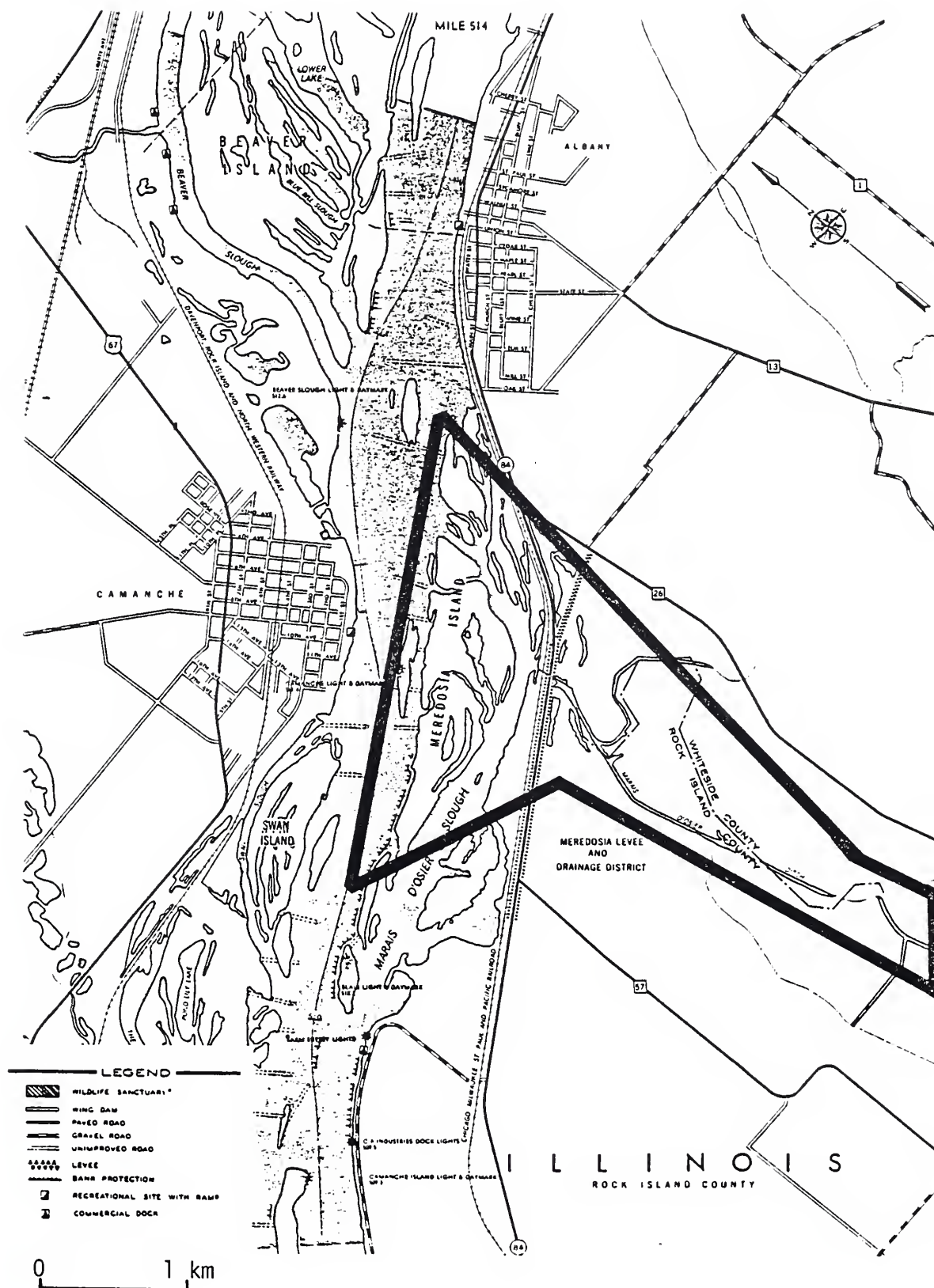


Figure 15. Area # 6: Meredosia Island - Meredosia Slough; Rock Island and Whiteside counties, Illinois; Mississippi River miles 510.0-512.5.

shallow backwater sloughs and marshes adjacent to a channelized drainage ditch (Meredosia Ditch). The slough and ditch provide good otter habitat, especially from spring through fall as evidenced by past reports. Activities of a resident beaver population provide adequate denning sites for otters on the slough and Meredosia Island. The entire area was previously identified as otter habitat during the Illinois Natural Areas Inventory (IDOC 1978). Areas to the north (i.e. Beaver Island Complex) and south provide important furbearer, waterfowl, and forest wildlife production (Peterson 1984).

MANAGEMENT RECOMMENDATIONS:

1. Preserve existing riparian and marsh habitats. The Meredosia Island - Meredosia Slough area provides good otter habitat during all seasons, based on past reports. Meredosia Island and habitats along the Mississippi River are protected by public ownership and management by the U.S. Fish and Wildlife Service. Meredosia Slough and its remnant habitats are privately owned and therefore threatened by additional drainage and clearing for agriculture. Preservation of remnant marshes and sloughs is essential if the area is to remain suitable for otters.

2. Restore marsh habitats of Meredosia Slough. As indicated, only remnants of the original slough remain, providing limited but good habitat for otters. Restoration of additional areas is recommended to supplement existing habitat and create a "green corridor" along the ditch. Restoration would require conversion of cropland to marsh or bottomland woods by closing side ditches. Purchase of land adjoining the ditch may be necessary to perform such restoration.

3. Install a culvert under Route 84 at the junction of Meredosia Ditch. At least 2 otters have been killed crossing Route 84 between Meredosia Slough and the Mississippi River; additional losses have probably occurred. Installation of a culvert under Route 84 at the junction of Meredosia Ditch would provide a secure travel lane for furbearers traveling between the slough and river.

4. Identify, survey, and monitor trappers. Trappers utilizing the area, particularly Meredosia Slough, should be identified. These individuals should be educated in otter sign identification and encouraged to avoid areas where otter sign is prevalent. They should be asked to provide harvest information, i.e. species and number taken, and surveyed as to observations of otter signs.

Appendix 7. Area # 7: Site specific management recommendations.

AREA NAME: Princeton Wildlife Area - Grant and Steamboat sloughs

STATE: Iowa

COUNTY: Scott

LEGAL DESCRIPTION:

EH SEC 23, SEC 24, SEC 25, NH & SEQ SEC 26, EH SEC 35, SEC 36, T80 N R5E

TOPOGRAPHIC QUADRANGLE: Cordova, ILL-IOWA 7.5

LAND OWNERSHIP: Public (State; Iowa) - Princeton Wildlife Area

Management: Iowa Conservation Commission
Wallace State Office Building
Des Moines, IA 50319

Field Headquarters:
Maquoketa Wildlife Unit
R.R. 1
Green Island, IA 52051

Public (Federal) - Grant and Steamboat sloughs

Management: Upper Mississippi River Wildlife
and Fish Refuge
1222 West 2nd Street
Winona, MN 55987

Field Headquarters:
District Refuge Manager
P.O. Box 250
Savanna, IL 61074

OTTER REPORTS:

<u>Year</u>	<u>Report</u>	<u>Source</u>
1966	a specimen of an otter came from Grant Slough	Bowles 1975
1972	a sick juvenile otter was found along the Mississippi River near Cordova, IL; it died a few days later	Thom, unpubl. data
1976	Rock Island County, IL: otters have been present along the Mississippi River in this county for at least 20 years	Thom, unpubl. data

1982	signs of 4 otters observed along Steamboat Slough (February)	Anderson 1982
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SITE DESCRIPTION:

The Princeton Wildlife Area contains approximately 480 ha (1184 acres) of marsh and timberland along the Mississippi River just below the mouth of Wapsipinicon River and north of Princeton, IA (Figs. 16, 17). The area is surrounded by a 5-km (3-mile) levee (Fig. 17) that protects it from flood waters of the Mississippi River. A water control structure located in the southeast corner of the area allows partial control of water levels. In summer, water depth is generally less than 1 m (3 feet) across the marsh which supports dense, impenetrable stands of arrowleaf and some cattail. Water clarity is excellent. The marshland provides excellent summer habitat for river otters and is enhanced by backwater areas at the confluence of the Wapsipinicon and Mississippi rivers to the north, which provide excellent wildlife production (Peterson 1984). The area is closed to trespass 15 September - 15 December.

Grant and Steamboat (Cordova) sloughs are backwaters of the Mississippi River east of the Princeton Wildlife Area (Figs. 16, 17). Both border islands supporting mixed bottomland hardwoods dissected by shallow backwater sloughs and narrow channels. Steamboat Slough was site of winter otter utilization in 1982 when signs of 4 otters were observed along the southeast edge (Anderson 1982). At that time, open water was present in the southern end of the slough (side channel) and the main channel east of the slough. The area provides important furbearer production, and is utilized by many hunters and trappers (Peterson 1984).

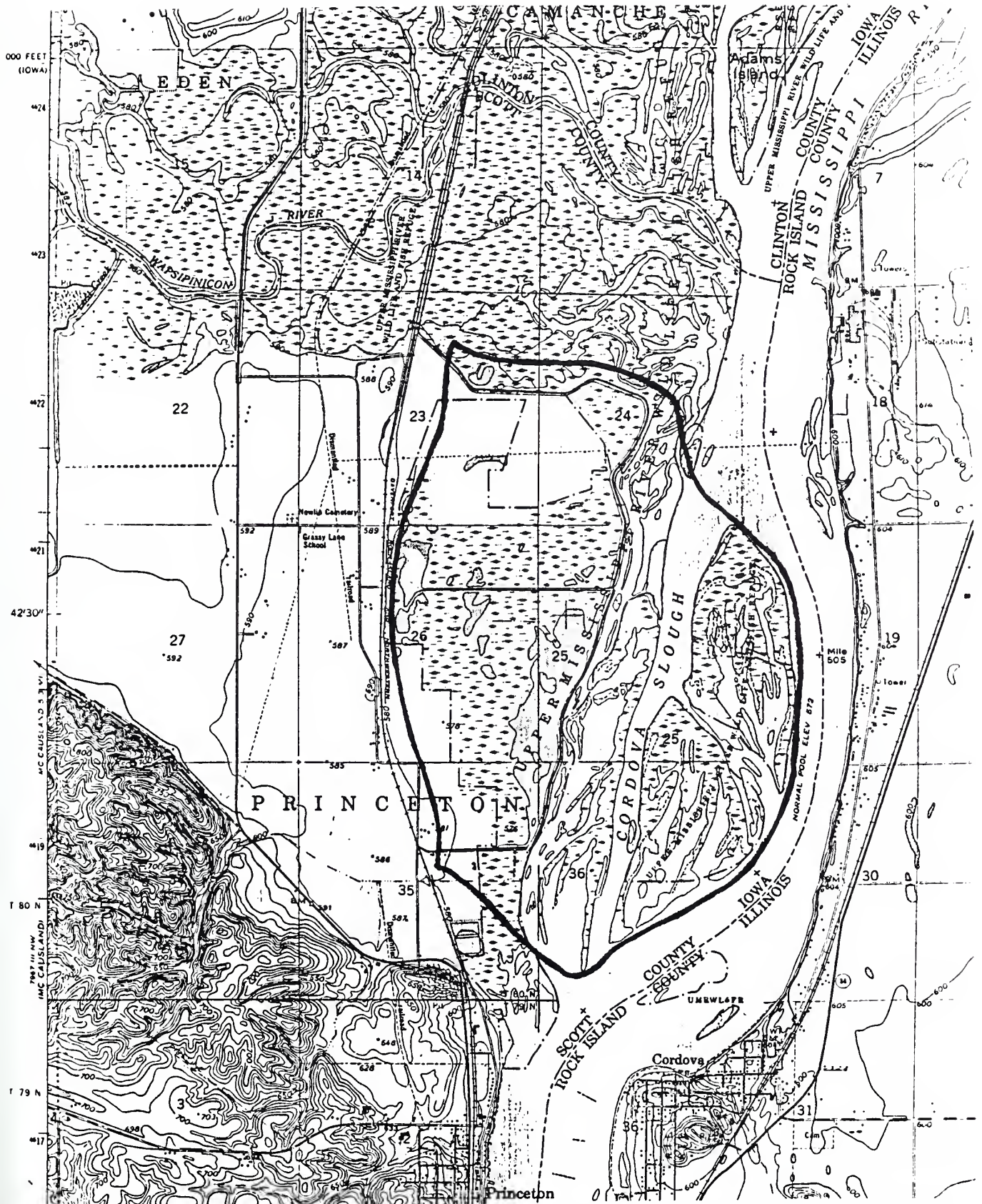


Figure 16. Area # 7: Princeton Wildlife Area - Grant and Steamboat sloughs; Scott County, Iowa; Cordova 7.5 Quadrangle.

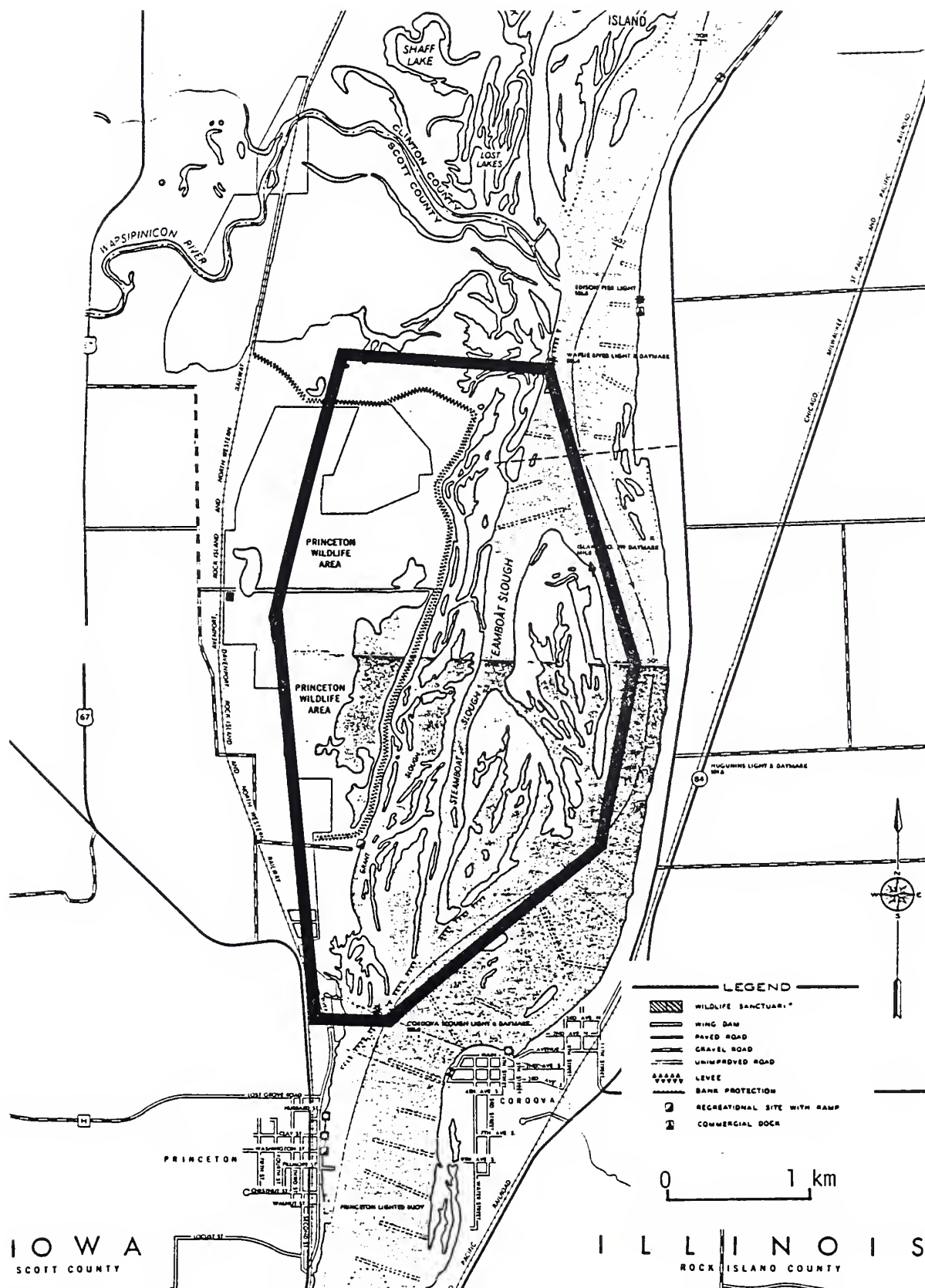


Figure 17. Area # 7: Princeton Wildlife Area - Grant and Steamboat sloughs; Scott County, Iowa; Mississippi River miles: 503.0-506.0.

MANAGEMENT RECOMMENDATIONS:

1. Preserve existing marsh and riparian habitats. The Princeton Wildlife Area is publicly owned and managed by the Iowa Conservation Commission thus preserving and maintaining marsh habitat. Management of the area for waterfowl is beneficial for otters and compatible with their management. Grant and Steamboat sloughs are part of the Upper Mississippi River Wildlife and Fish Refuge and therefore protected.

2. Deepen open water area west of levee on Princeton Wildlife Area. Due to the shallow nature of the Princeton Wildlife Area, winter fish kills probably occur. Deepening of the shallow, open water area adjacent to the levee (Figs. 16, 17) would help alleviate this problem and significantly enhance the area for use by otters. Dredged material could be used to reinforce the levee system providing additional protection from flood waters.

3. Construct log piles adjacent to levee. Trees removed during construction and/or maintenance of the existing levee were left adjacent to the levee. These should be used to construct several log piles along the edge of the open water area and the levee to provide additional foraging and denning sites for otters. Placement of the piles a short distance from the edge of the levee would discourage the construction of bank dens by beavers using the piles; such dens would weaken the existing levees which are quite low.

Appendix 8. Area # 8: Site specific management recommendations.

AREA NAME: Lock and Dam 14 - Arsenal Island - Rock River mouth

STATE: Illinois, Iowa

COUNTY: Rock Island, IL; Scott, IA

LEGAL DESCRIPTION:

EH SEC 8, NEQ SEC 9, T78N R5E
 SH SEC 4, T18N R1E
 NH SEC 36, T18N R2W
 SEC 9, SWQ SEC 10, NH SEC 15, NH & SWQ SEC 16, SEC 17, SEQ SEC 18,
 NH SEC 19, NH SEC 20, T17N R2W
 SEC 24, T17N R3W
 WH SEC 3, SH SEC 4, SEQ SEC 7, SEC 8, NH & SWQ SEC 9, NWQ SEC 17,
 NEQ SEC 18, T17N R3E

TOPOGRAPHIC QUADRANGLE: Silvis, ILL-IOWA 7.5
 Davenport East, IOWA-ILL 7.5
 Milan, ILL-IOWA 7.5
 Andalusia, ILL-IOWA 7.5

LAND OWNERSHIP: Public (Federal) - Lock and Dam 14
 Arsenal Island
 Rock River mouth

Management: Rock Island District, Corps of Engineers
 Clock Tower Building
 Rock Island, IL 61202

Upper Mississippi River Wildlife
 and Fish Refuge
 1222 West 2nd Street
 Winona, MN 55987

Private - Rock Island mouth

Landowners: N. Berg
 R. Bollinger
 Hugh Gray
 Home Construction Equipment Co.
 L.A. Odean
 S. Pearson
 Pettifer's Island
 Elmer Redding
 Sullivan's Subdivision

OTTER REPORTS:

<u>Year</u>	<u>Report</u>	<u>Source</u>
1976	Rock Island County, IL: otters have been present along the Mississippi River in this county for at least 20 years	Thom, unpubl. data

SITE DESCRIPTION:

It was hypothesized that the Quad Cities (Rock Island and Moline, IL and Davenport and Bettendorf, IA) may create a dispersal barrier to river otters traveling along the Mississippi River (Anderson 1982). The cities (Fig. 18) occupy both sides of the river for a distance of about 16 km (10 miles), and suitable riparian habitat is lacking, except for a small site on Arsenal Island, for another 6 km (4 miles) north to Lock and Dam 14. Movement of a radio-implanted otter through or around the cities in 1983 suggested at least some continuity of otter populations to the north and south of them (Anderson and Woolf 1984). Small backwater marshes or sloughs exist just north of Lock and Dam 14 (Fig. 19) and on the southeastern edge of Arsenal Island (Fig. 20). These habitats are critical as temporary resting sites for otters traveling along the river corridor. Sites at the northern tip and eastern edge of Arsenal Island were identified as important wildlife habitat (Peterson 1984), and may provide additional otter habitat. Numerous sloughs and lakes adjacent to, and south of, the Rock River mouth (Fig. 21), including areas in Iowa (i.e. Pelican Island, Credit Island, and Nahant Marsh), provide more extensive habitat and are noted as important wildlife habitat (Peterson 1984). All the areas appear subject to flooding by the Mississippi River.

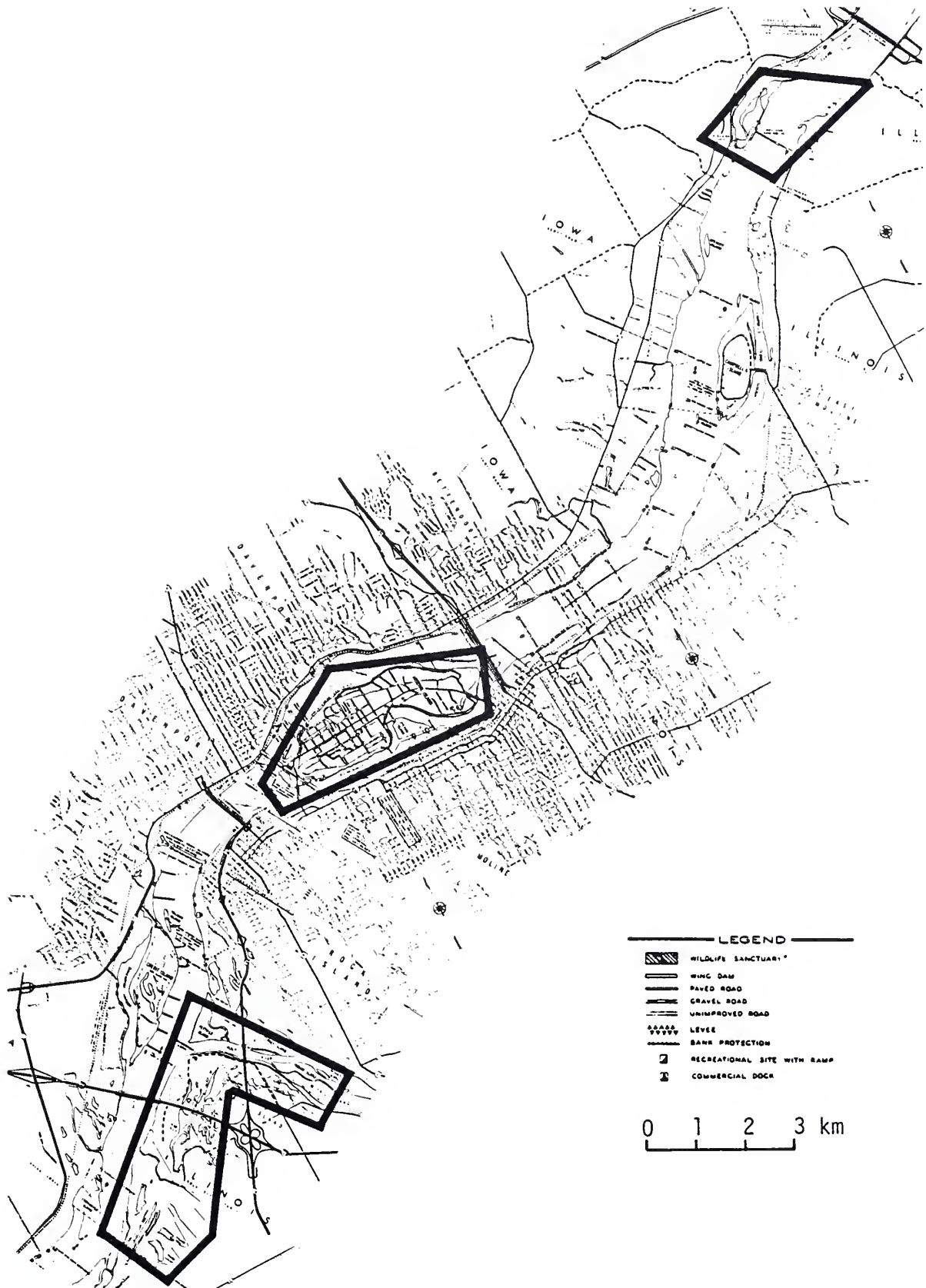


Figure 18. Area # 8; Lock and Dam 14 - Arsenal Island - Rock River mouth; Rock Island County, Illinois and Scott County, Iowa; Mississippi River miles: 476.7-494.0.

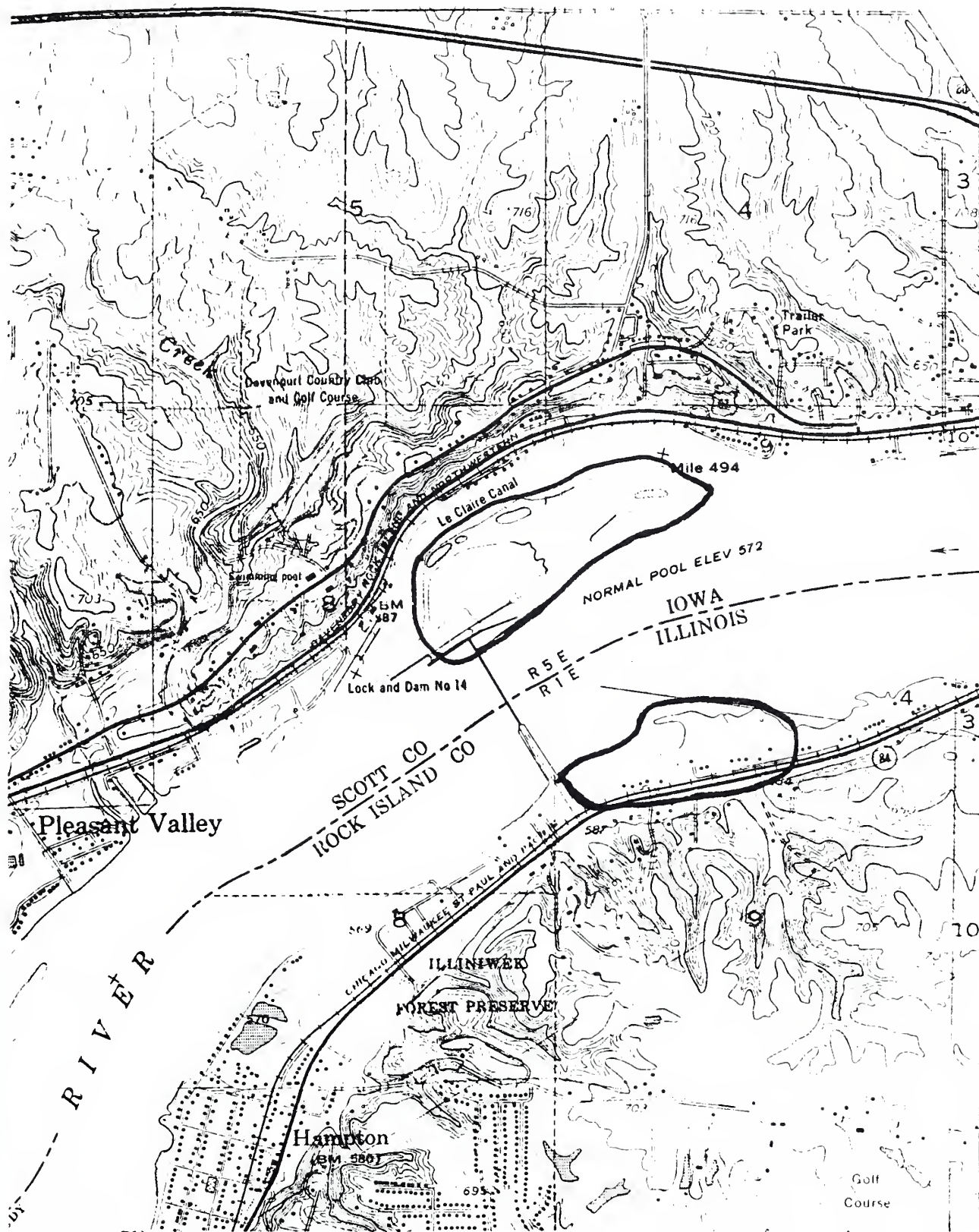


Figure 19. Area # 8: Lock and Dam 14; Rock Island County, Illinois and Scott County, Iowa; Silvis 7.5 Quadrangle.

Figure 20. Area # 8: Arsenal Island; Rock Island County, Illinois; Davenport East 7.5 Quadrangle.

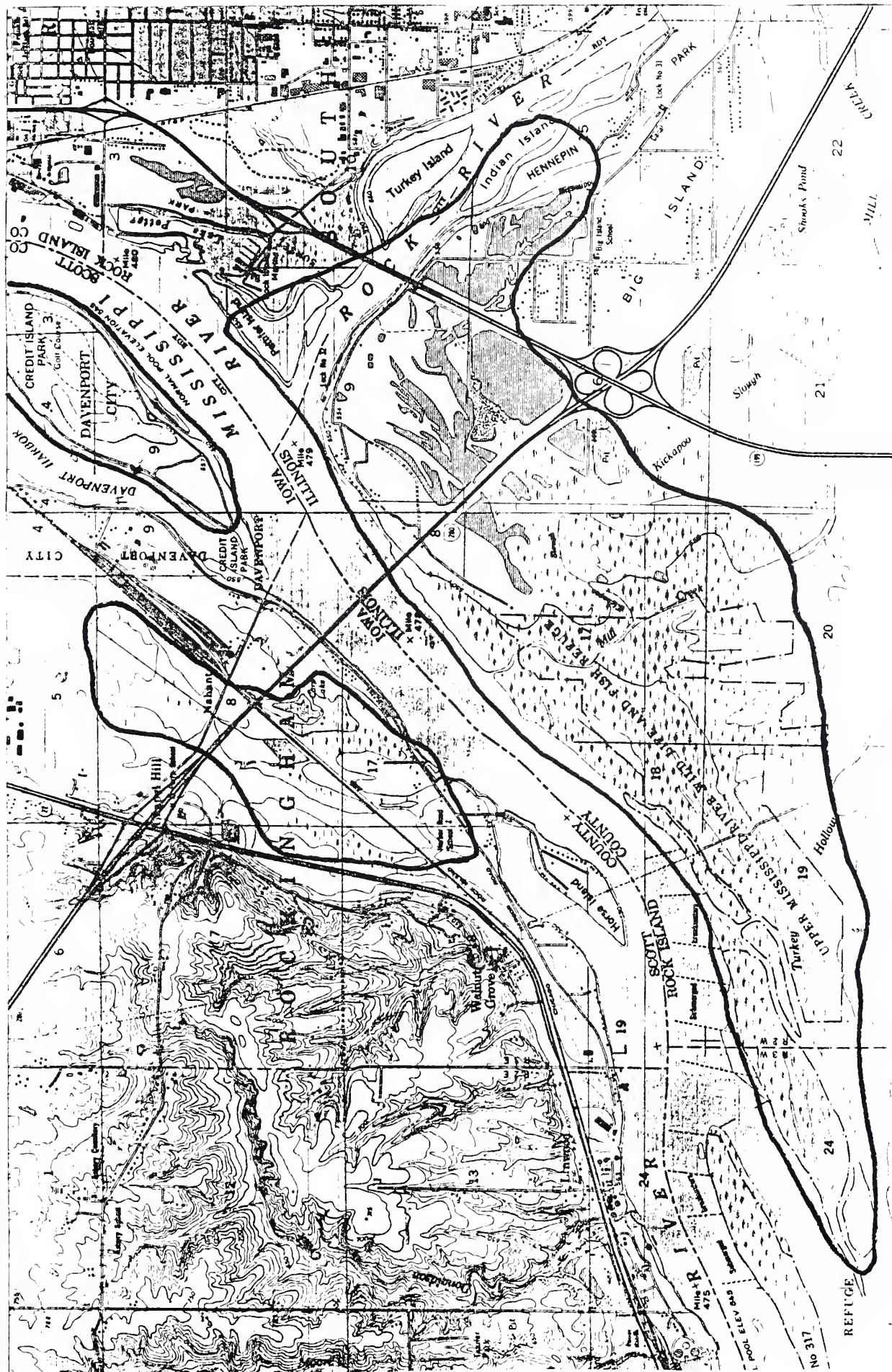


Figure 21. Area # 8: Rock River mouth; Rock Island County, Illinois and Scott County, Iowa; Andalusia 7.5 Quadrangle.

MANAGEMENT RECOMMENDATIONS:

1. Preserve existing marsh and riparian habitats. Marshes and sloughs at Lock and Dam 14 and Arsenal Island are publicly owned and protected through management by the U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers. A portion of the area south of Rock River mouth is also so protected; the remainder is privately owned and in need of protection. Due to the proximity of highly developed areas and associated disturbances, no habitat enhancements are recommended. The Rock River mouth area, particularly lakes and borrow pits adjacent to Interstate 280, has considerable potential for otter utilization, provided wooded riparian habitats are protected.

Appendix 9. Area # 9: Site specific management recommendations.

AREA NAME: Lake Odessa - Turkey and Otter islands

STATE: IOWA

COUNTY: Louisa

LEGAL DESCRIPTION:

NH & SEQ SEC 7, SEC 8, SWQ SEC 9, SWQ SEC 15, SEC 16, SEC 17, EH SEC 18,
 NH & SEQ SEC 20, SEC 21, SEC 22, WH SEC 26, SEC 27, SEC 28, EH SEC 33,
 SEC 34, SEC 35, SWQ SEC 36, T74N R2W
 NWQ SEC 1, SEC 2, NH & SEQ SEC 3, NWQ SEC 11, T73N R2W

TOPOGRAPHIC QUADRANGLE: Toolesboro, IOWA-ILL 7.5
 Wapello, IOWA 7.5
 Wapello, IOWA-ILL 15

LAND OWNERSHIP: Public (Federal; State, Iowa)

Management: Mark Twain National Wildlife Refuge
 311 North 5th Street
 Quincy, IL 62301

Field Headquarters:
 MTNWR, Louisa Division
 R.R. 1
 Wapello, IA 52653

Iowa Conservation Commission
 Wallace State Office Building
 Des Moines, IA 50319

OTTER REPORTS:

<u>Year</u>	<u>Report</u>	<u>Source</u>
1982	an otter was cuaght by a commercial fisherman in the Mississippi River, 1.6 km north of New Boston, IL (March)	Anderson and Woolf 1984
1983	radio implanted otter utilized Lake Odessa and surrounding area (June-December)	Anderson and Woolf 1984

SITE DESCRIPTION:

The Lake Odessa area contains a complex network of backwater sloughs, ponds, and lakes along the Mississippi River just north of the Iowa River mouth (Figs. 22, 23). It is important habitat for furbearers, waterfowl,

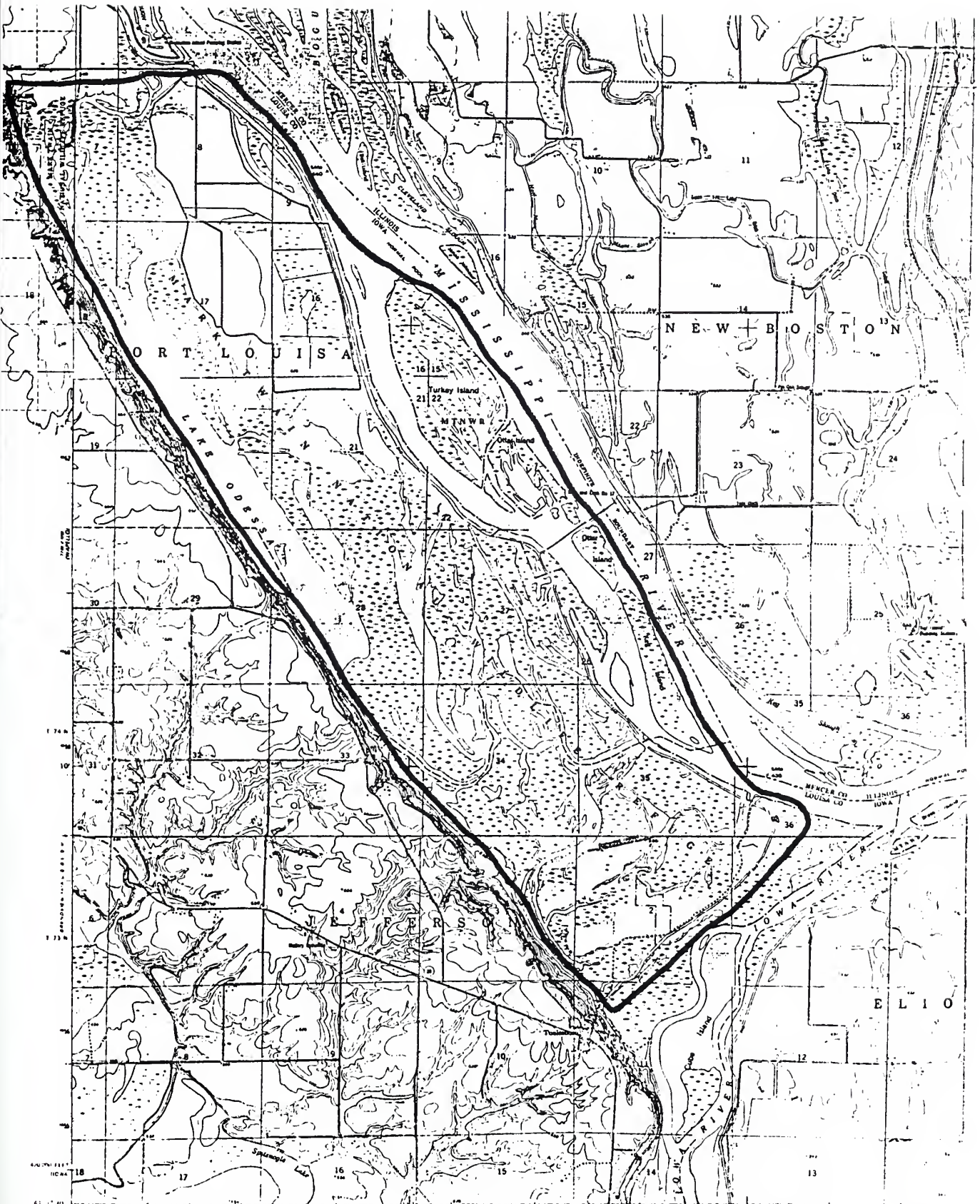


Figure 22. Area # 9: Lake Odessa - Turkey and Otter islands; Louisa County, Iowa; Toolesboro 7.5 and Wapello 7.5 Quadrangles.

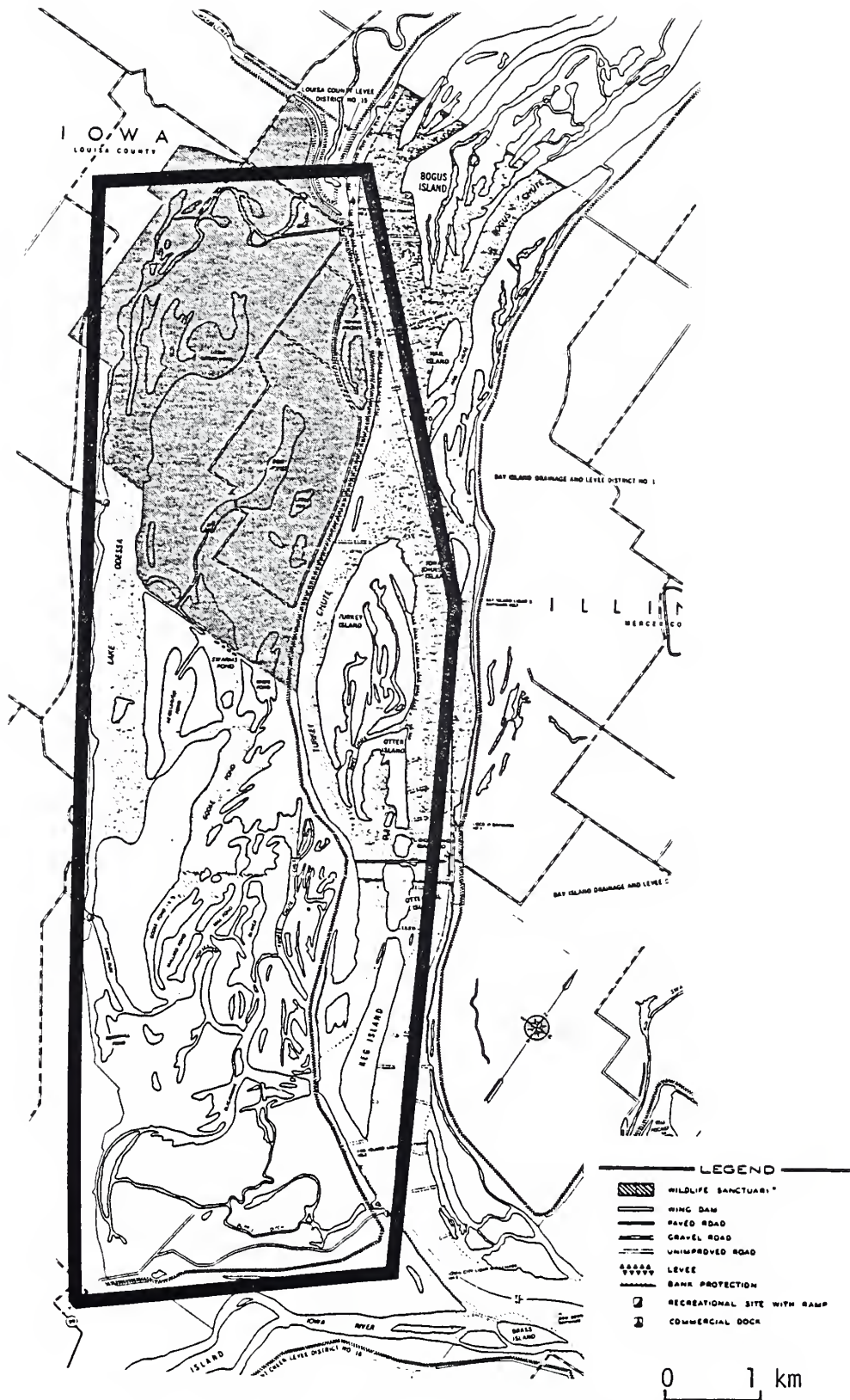


Figure 23. Area # 9: Lake Odessa - Turkey and Otter islands; Louisa County, Illinois; Mississippi River miles: 435.0-441.0.

and forest wildlife (Peterson 1984). The southern two-thirds of the area is marsh and timberland dissected by open water areas; the northern portion is predominately cropland with scattered ponds and sloughs. The entire area is surrounded by a 16-km (10-mile) levee that protects it from flood waters of the Mississippi River. A water control structure located in the southeastern corner of the area allows partial control of water levels. The northern portion of the area, the Louisa Refuge (Fig. 23), is in the Mark Twain National Wildlife Refuge and closed to hunting, providing some protection and seclusion for otters. The 1050-ha (2600-acre) refuge is managed primarily to provide for the needs of migratory and nesting waterfowl and wintering bald eagles. Water quality is good in isolated areas, but degraded in others due to shallow depths and agitation of bottom sediments by rough fish and waves generated by boats and wind. A recent otter capture and telemetry data (Anderson and Woolf 1984) suggest suitable summer habitat occurs on the area. In March 1982, an otter was accidentally caught by a commercial fisherman in the Mississippi River near the southeastern tip of the area (Anderson and Woolf 1984). On 4 occasions from June-November 1983, a radio-implanted otter was located in the Lake Odessa area (Anderson and Woolf 1984). Transmitter location points included sites along backwater ponds and sloughs throughout the area (Fig. 24).

Turkey and Otter islands, wooded islands located just north of Lock and Dam 17 and east of the Lake Odessa area (Figs. 22, 23), may provide important winter habitat for otters. In December 1983, a radio-implanted otter was located at the southern tip of Otter Island (Fig. 24); open water along Swift Shoot probably provided a suitable foraging area (Anderson and

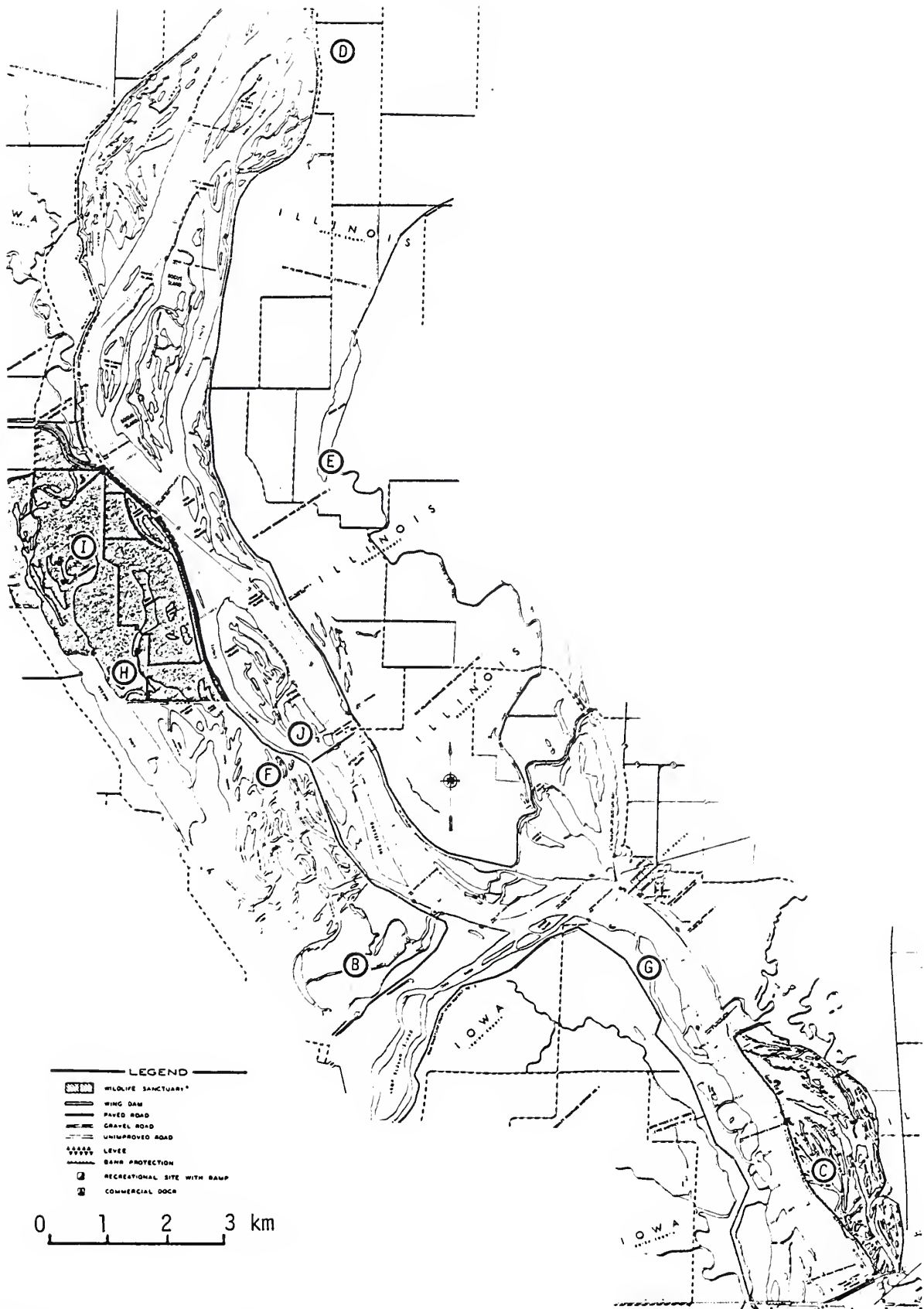


Figure 24. Transmitter location points (B-J) for adult male otter M1 in the Lake Odessa and Keithsburg areas, 30 June - 19 December 1983 (From Anderson and Woolf 1984).

Woolf 1984). Additional areas of open water were along Burris Ditch of the Lake Odessa area and at the Iowa River mouth.

The Lake Odessa - Turkey and Otter Islands area is enhanced by nearby habitats in Illinois used by the implanted otter (Fig. 24), including drainage ditches, Swan Lake, Swan Lake slough, and New Boston Marsh; the latter was identified as a significant natural area containing high quality wetland habitat during the Illinois Natural Areas Inventory (IDOC 1978). In addition, the Keithsburg area (Area # 10) contains suitable habitat and is located only 2.8 km (3.0 miles) to the south.

MANAGEMENT RECOMMENDATIONS:

1. Preserve existing marsh and riparian habitats. As indicated, the Lake Odessa - Turkey and Otter islands area contains suitable summer and winter habitat for otters. Preservation of existing habitat is therefore essential. The Lake Odessa area is protected through public ownership, and management by the Iowa Conservation Commission. Turkey and Otter islands are protected and administered as part of Mark Twain National Wildlife Refuge, Louisa Division.

2. Survey and monitor trappers. Trappers who utilize the Lake Odessa area should be identified, educated in otter sign identification, and, subsequent to the trapping season, surveyed as to observations of otter signs. Reports from the area indicate potential utilization by otters which needs documentation. Sites frequented by otters need identification and subsequent protection.

3. Close area to beaver trapping. Conversations with refuge personnel and field surveys in 1983 indicated very limited beaver activity in the Lake Odessa area. Protection of the present beaver population is of primary importance, but, identification of limiting factors is also

important as they may limit the otter population as well. Due to the low topography of the area, major problems may exist related to water level fluctuations.

4. Construct log piles adjacent to lakes. Limited beaver activity suggests secure den sites may be lacking on the area. Construction of log piles adjacent to isolated lakes or sloughs is recommended as an enhancement effort.

5. Deepen lakes in Lake Odessa area. Deepening of portions of several lakes would enhance their potential for use by otters. Recommended sites area lakes and ponds in the northern "closed" portion of the area, and those adjacent to the levee in the southern portion. Equipment access across cropland or the levee would minimize habitat disturbances. Dredged material should be used to create elevated sections of shoreline or reinforce levees. Trees removed should be placed in piles adjacent to these sites.

Appendix 10: Area # 10: Site specific management recommendations.

AREA NAME: Keithsburg

STATE: Illinois

COUNTY: Mercer

LEGAL DESCRIPTION:

SEQ SEC 28, NH & SWQ SEC 33, T14N R5W

WH & SEQ SEC 4, SEQ SEC 5, NEQ SEC 8, SEC 9, WH SEC 10, SEC 15,
EH SEC 16, SEC 22, WH & NEQ SEC 23, T13N R5WTOPOGRAPHIC QUADRANGLE: Joy, ILL-IOWA 7.5
Keithsburg, ILL-IOWA 7.5
Keithsburg, ILL-IOWA 15

LAND OWNERSHIP: Public (State, Illinois)

Management: Mark Twain National Wildlife Refuge,
Keithsburg Division
311 North 5th Street
Quincy, IL 62301Illinois Department of Conservation
Springfield, IL 62706

Private

Landowners: S.H. Prentiss
Clyde Wagner
Robert Watts
Loren Willits

OTTER REPORTS:

<u>Year</u>	<u>Report</u>	<u>Source</u>
1983	radio implanted otter utilized area (July)	Anderson and Woolf 1984

SITE DESCRIPTION:

The Keithsburg area contains marsh and timberland among a complex network of backwater sloughs and lakes along the Mississippi River just north of Keithsburg, IL, and situated between Edwards River and Pope Creek (Figs. 25, 26). The area is identified as important habitat for

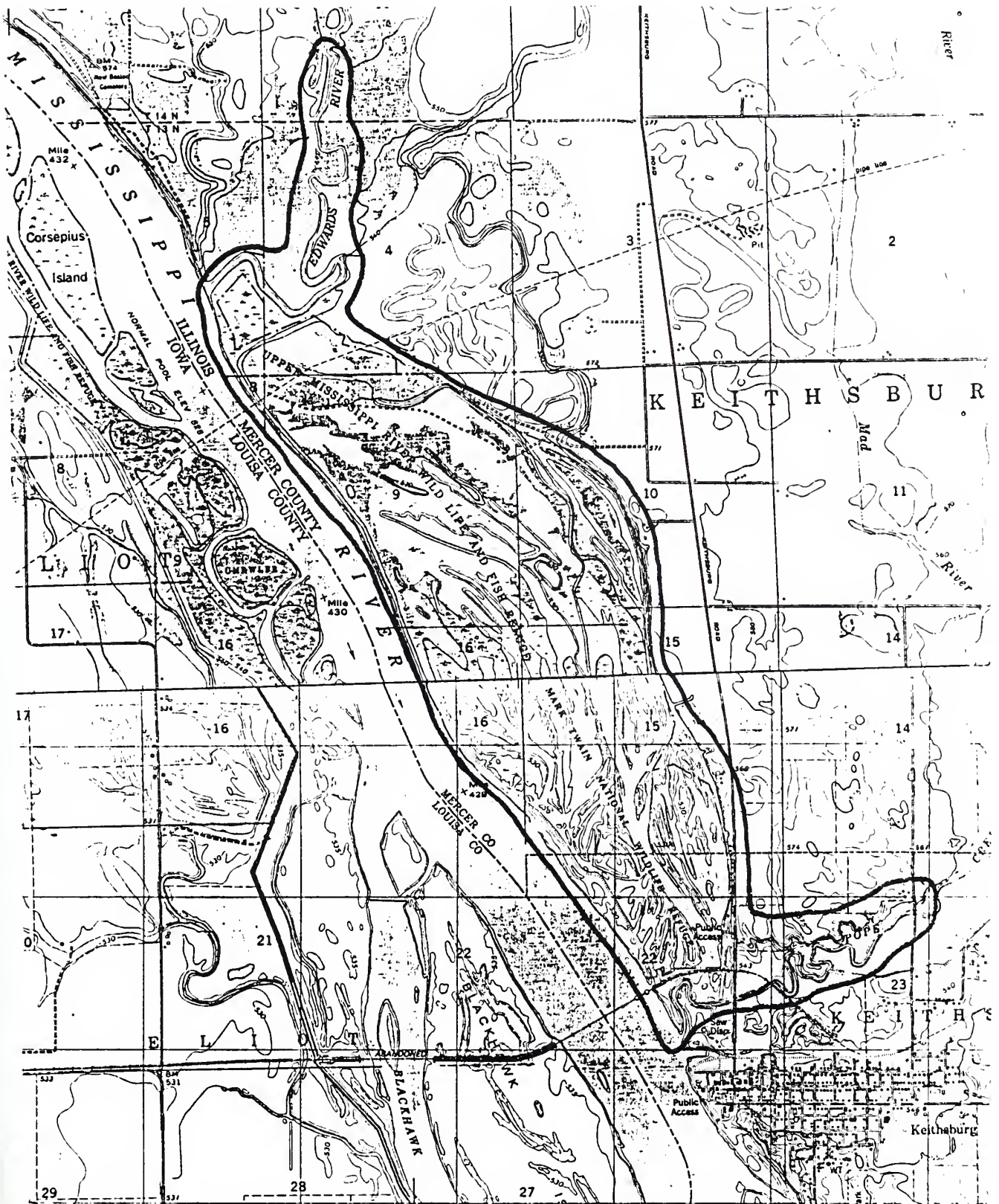


Figure 25. Area # 10: Keithsburg; Mercer County, Illinois; Joy 7.5 and Keithsburg 7.5 Quadrangles.

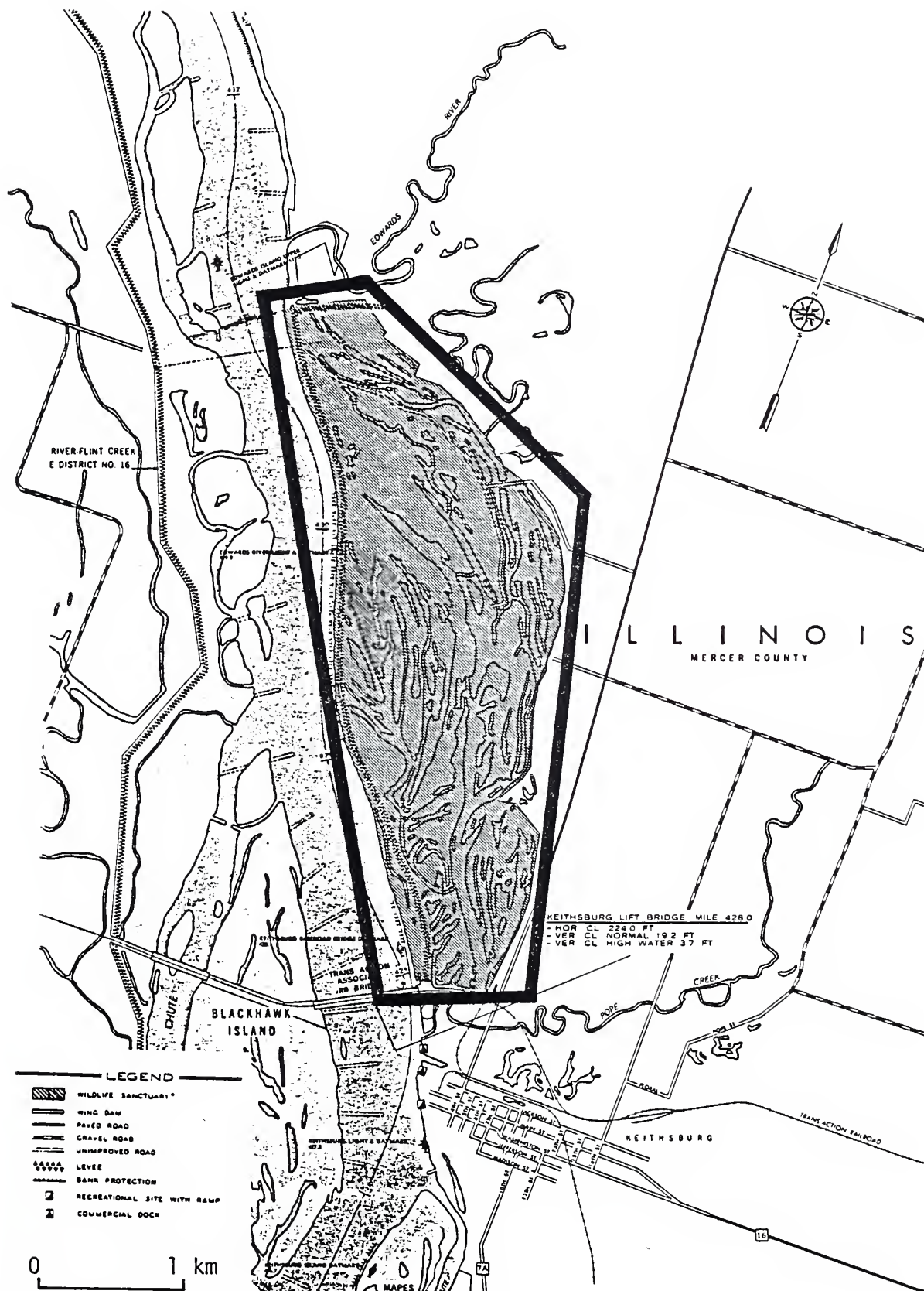


Figure 26. Area # 10: Keithsburg; Mercer County, Illinois; Mississippi River miles: 428.0-431.0.

furbearers, waterfowl, and forest wildlife (Peterson 1984). It is in the Mark Twain National Wildlife Refuge, Keithsburg Division, and open to limited public hunting and other activities, but closed to trespass from October 15 - January 31. A 5-km (3-mile) levee surrounds the area and protects it from flood waters of the Mississippi River. A water control structure located in the southwest corner of the area allows partial control of water levels. In general, lakes and sloughs in the area are very shallow (less than 1 m (3 feet)); except, the main channel through the area and sites adjacent to the abandoned railroad bed at the south end are deeper. Water quality is good in isolated areas, but degraded in others due to shallow depths and agitation of bottom sediments by rough fish and waves generated by boats and wind. Winter habitat conditions are unknown; however, the proximity of Edwards River and Pope Creek, the lower portions of which are wooded, may enhance the area for winter otter utilization. Presence of beavers suggest adequate otter denning sites are available.

MANAGEMENT RECOMMENDATIONS:

1. Preserve existing marsh and riparian habitats. The Keithsburg area contains suitable summer habitat for otters, and is protected and managed as part of the Mark Twain National Wildlife Refuge, Keithsburg Division. Potential winter habitat along lower Edwards River and Pope Creek is privately owned and in need of protection.
2. Deepen sloughs adjacent to levee. The area could be significantly enhanced for otter utilization by deepening several sloughs adjacent to the western levee. Water clarity is particularly good in these isolated branches, and wooded riparian habitats provide suitable denning sites. The levee would provide equipment access with minimal site disturbance. Dredged material could be used to reinforce the levee and/or create

elevated sections of shoreline. Any trees removed should be placed in piles adjacent to the sloughs to provide additional denning and foraging sites.

5. Identify, survey, and monitor trappers. Trappers utilizing the area should be identified and asked to provide harvest information, i.e. species and number taken. Because of the potential this area has for otter utilization, trappers should be educated in otter sign identification and subsequently surveyed as to observations.

Appendix 11. Area # 11: Site specific management recommendations.

AREA NAME: Phelps and Prairie sloughs - Oquawka State Wildlife Refuge -
Crystal Lake

STATE: Illinois

COUNTY: Henderson

LEGAL DESCRIPTION:

SWQ SEC 28, SEQ SEC 29, EH & SWQ SEC 32, WH SEC 33, T11N R5W
SEC 6, NWQ SEC 7, T10N R5W
SEC 1, SEC 12, SH SEC 22, SWQ SEC 23, SEC 26, SEC 27, NH SEC 34,
NWQ SEC 35, T10N R6W

TOPOGRAPHIC QUADRANGLE: Oquawka, ILL-IOWA 7.5
Kingston, IOWA-ILL 7.5
Burlington, IOWA-ILL 7.5
Oquawka, ILL-IOWA 15

LAND OWNERSHIP: Public (State; Illinois) - Oquawka State Wildlife Refuge

Management: Illinois Department of Conservation
Springfield, IL 62706

Private - Phelps and Prairie sloughs
Crystal Lake

Landowners: Alice Craig
George Lewis Jr.
Charles Lightfoot
New Crystal Lake Club
Alice Pruett
Sam Stevenson
Stevenson & Ditto

OTTER REPORTS: No Recent Reports

SITE DESCRIPTION:

This complex consists of 3 small areas of backwater lakes and sloughs located 23 km (14 miles) south of Area # 11: Keithsburg area; all are at least partially protected by the Mississippi River levee system (Fig. 27).

Situated along a 14-km (9-mile) stretch of the river, north of Gulfport to about Oquawka, IL (Fig. 27), they provide good - excellent summer habitat

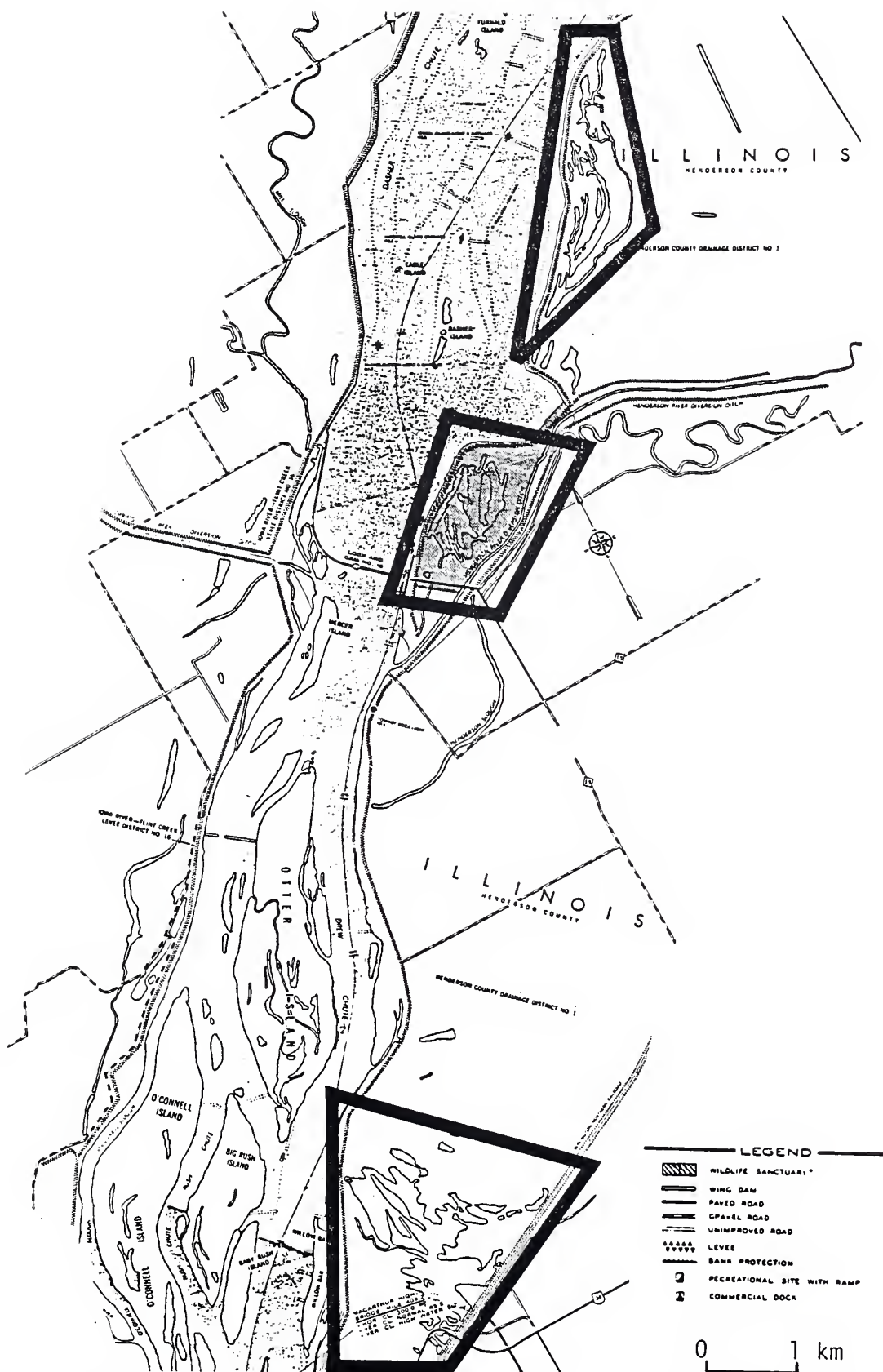


Figure 27. Area # 11: Phelps and Prairie sloughs - Oquawka State Wildlife Refuge - Crystal Lake; Henderson County, Illinois; Mississippi River miles: 405.0-414.2.

for otters. All are identified as important wildlife habitat (Peterson 1984).

Phelps and Prairie sloughs (Fig. 28), located 3 km (2 miles) south of Oquawka, provide suitable summer habitat for otters along the shallow backwater sloughs isolated from the river by the levee system. Wooded riparian habitat borders the sloughs providing suitable otter denning sites. A pumping station located south of the area at Henderson Creek Diversion Ditch allows partial control of water levels.

Oquawka State Wildlife Refuge (Fig. 29), just east of Lock and Dam 18, contains shallow lakes and sloughs bordered by bottomland woods. The area is only partially protected by the levee system due to Henderson Creek Diversion Ditch exit, which allows waters from the Mississippi River to inundate the area during floods. This detracts from the area's suitability as otter habitat during high river stages. The area is closed to hunting, and trespass from October 1 to May 1. Proximity of the refuge and Phelps and Prairie sloughs to Henderson Creek Diversion Ditch (Fig. 28), the lower portion of which is wooded, enhances both for winter otter utilization.

Crystal Lake (Fig. 30) contains excellent summer habitat for otters in its shallow lake and adjacent marshes. The area was identified during the Illinois Natural Areas Inventory as a significant natural area containing high quality floodplain forest, marsh, and prairie (IDOC 1978). A pumping station at the junction of the lake and levee in the northwest part of the area allows partial control of water levels. Water clarity in the lake is good - fair, depending on water depths, rough fish activity, and wave action. Presence of numerous duck blinds on the area suggest considerable utilization for waterfowl hunting. Observation of much past and present

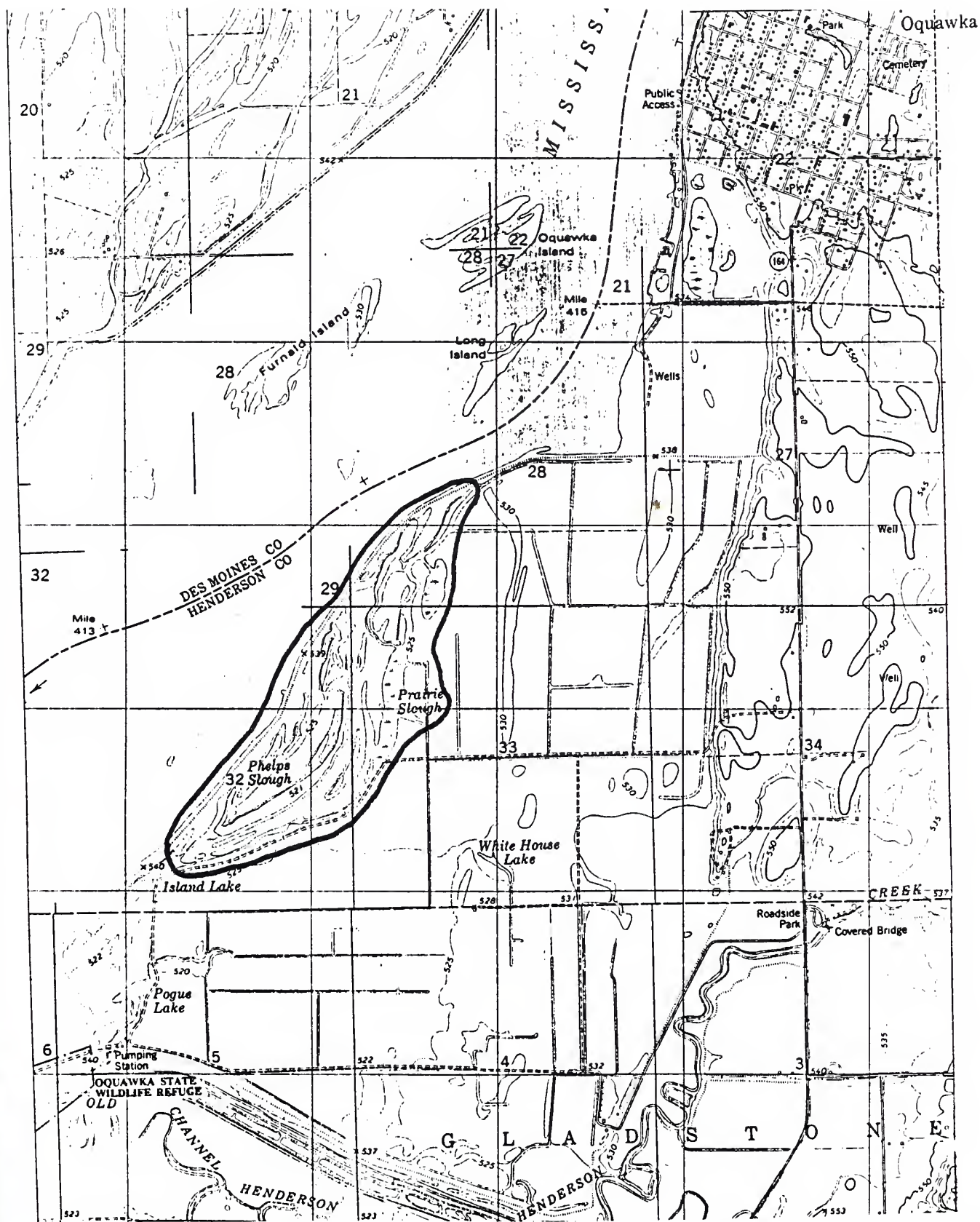
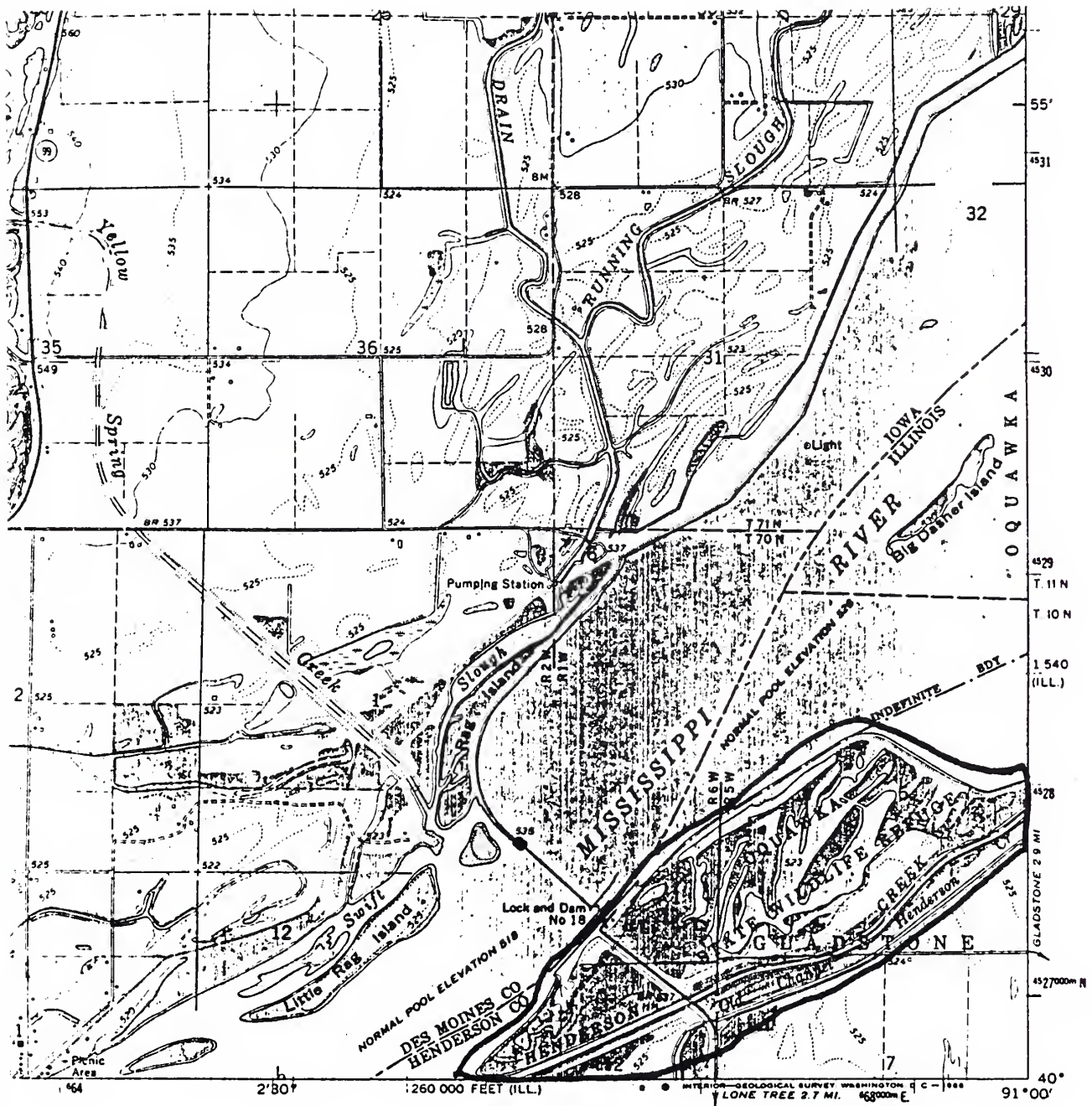


Figure 28. Area # 11: Phelps and Prairie sloughs; Henderson County, Illinois; Oquawka 7.5 Quadrangle.



ROAD CLASSIFICATION

Heavy-duty ——— Light-duty ———
 Medium-duty ——— Unimproved dirt ———

○ State Route



QUADRANGLE LOCATION

KINGSTON, IOWA-ILL.

NE 1/4 BURLINGTON 15' QUADRANGLE
 N4052.5—W9100/7.5

1964

Figure 29. Area # 11: Oquawka State Wildlife Refuge; Henderson County, Illinois; Kingston 7.5 Quadrangle.

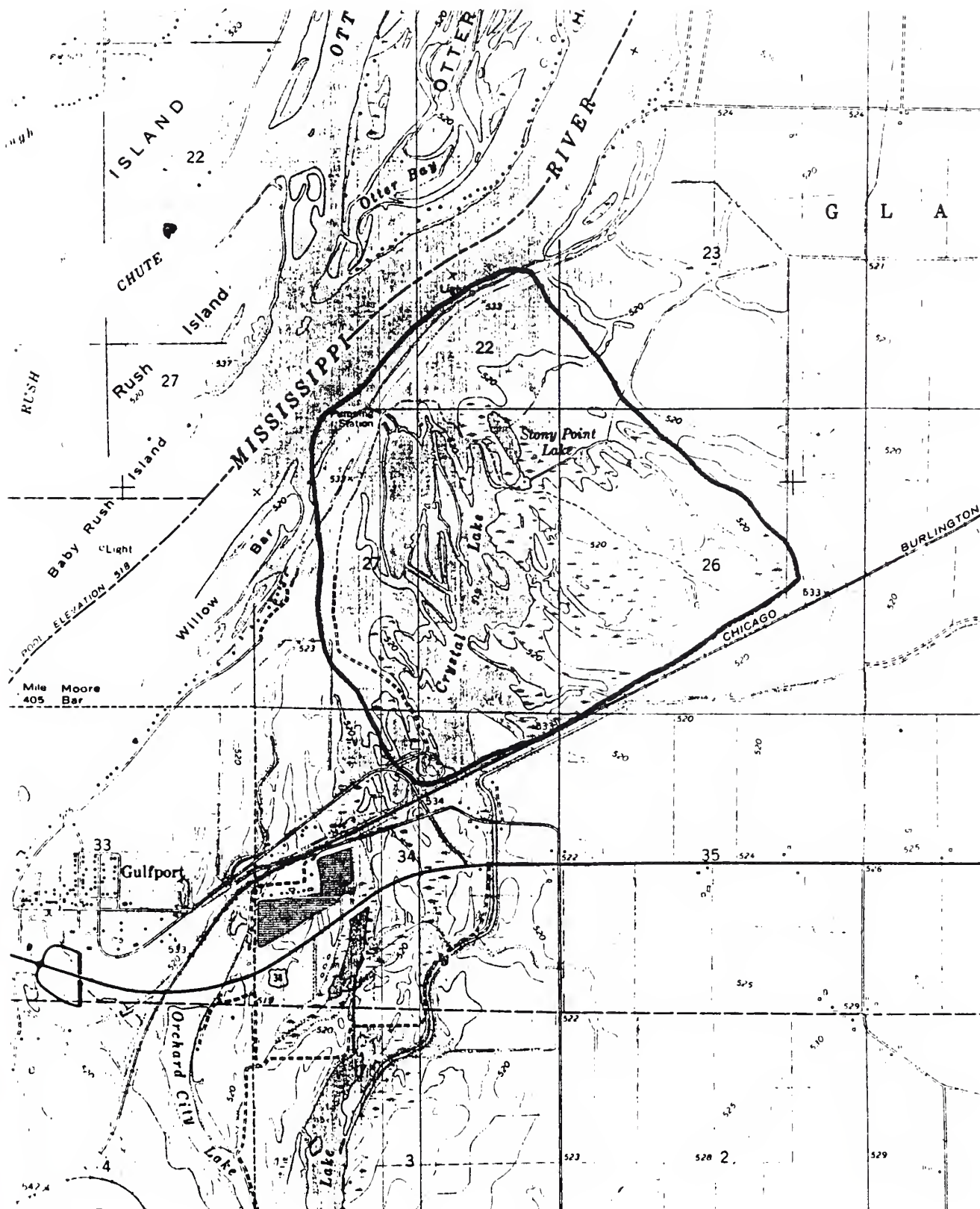


Figure 30. Area # 11: Crystal Lake; Henderson County, Illinois; Burlington 7.5 Quadrangle.

beaver activity indicates a substantial population, thus providing adequate otter denning sites and supporting the area's identification as suitable otter habitat.

MANAGEMENT RECOMMENDATIONS:

1. Preserve existing marsh and riparian habitats. Phelps and Prairie sloughs are privately owned and need protection. Oquawka State Wildlife Refuge is publicly owned and protected through management by the Illinois Department of Conservation. Henderson Creek Diversion Ditch is privately owned west of the refuge, and wooded borders along at least the lower 3 km (2 miles) should be preserved as potential winter habitat. Crystal Lake is privately owned and managed by the New Crystal Lake Club. Cooperation between IDOC and the club should assure protection and proper management of this fine area.

2. Identify, survey, and monitor trappers. Trappers utilizing these areas should be identified and asked to provide harvest information, i.e. species and number taken. Trappers should be educated in otter sign identification and, subsequent to the trapping season, surveyed as to observation.

3. Deepen sloughs and lakes. All 3 areas could be considerably enhanced by dredging of existing aquatic habitats. Areas adjacent to levees are preferred sites for dredging to provide equipment access and minimal site disturbances. Trees removed should be placed in piles adjacent to these sites. Due to its larger size and high quality marshes, Crystal Lake would benefit most from such enhancement; however, identification as a state natural area may preclude enhancement efforts. Further, in its present condition it has considerable potential for otter utilization.

Appendix 12. Area # 12: Site specific management recommendations.

AREA NAME: Quincy Bay

STATE: Illinois

COUNTY: Adams County

LEGAL DESCRIPTION:

SEQ SEC 15, SH SEC 16, SEC 21, SEC 22, SEC 27, EH SEC 28, NH SEC 34,
T1S R9W

TOPOGRAPHIC QUADRANGLE: Quincy West, ILL-IOWA 7.5

LAND OWNERSHIP: Public (Federal)

Management: Mark Twain National Wildlife Refuge
311 North 5th Street
Quincy, IL 62301

OTTER REPORTS: No Recent Reports

SITE DESCRIPTION:

The Quincy Bay area contains backwater sloughs and lakes along the Mississippi River just northwest of Quincy, IL (Figs. 31, 32) and 116 km (72 miles) south of Area # 11. The area is separated from the river by a relatively wide (0.4-0.8 km (0.2-0.5 mile)) stretch of timberland, providing protection from inflow of river water at it's upper end, except during high river stages. This increases water clarity in the area and buffers it from flood waters. The area lacks seclusion due to the proximity of Quincy and an associated increase in recreational activity; the bay area proper is a popular water sports and sport fishing area (Peterson 1984).

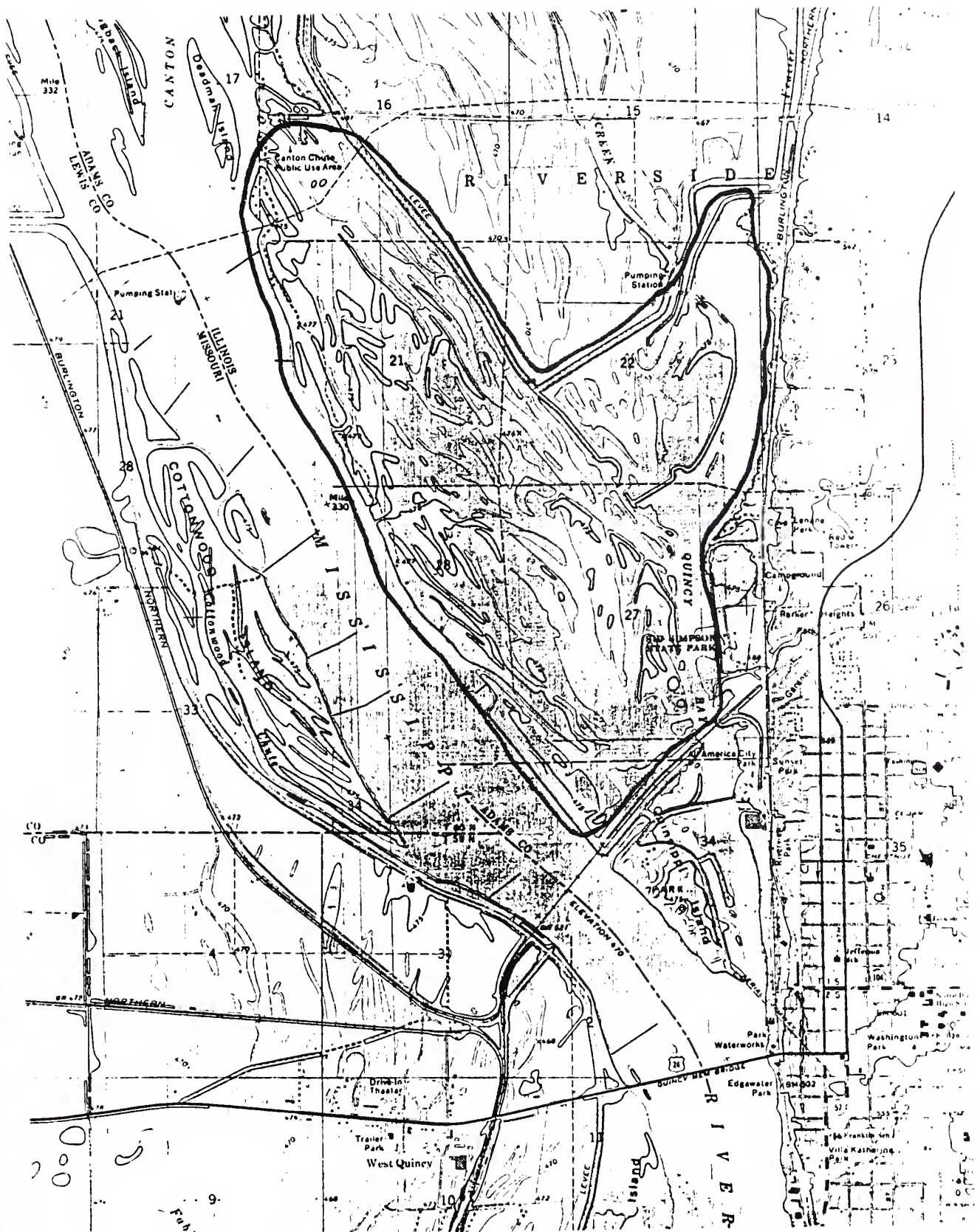


Figure 31. Area # 12: Quincy Bay; Adams County, Illinois; Quincy West 7.5 Quadrangle.

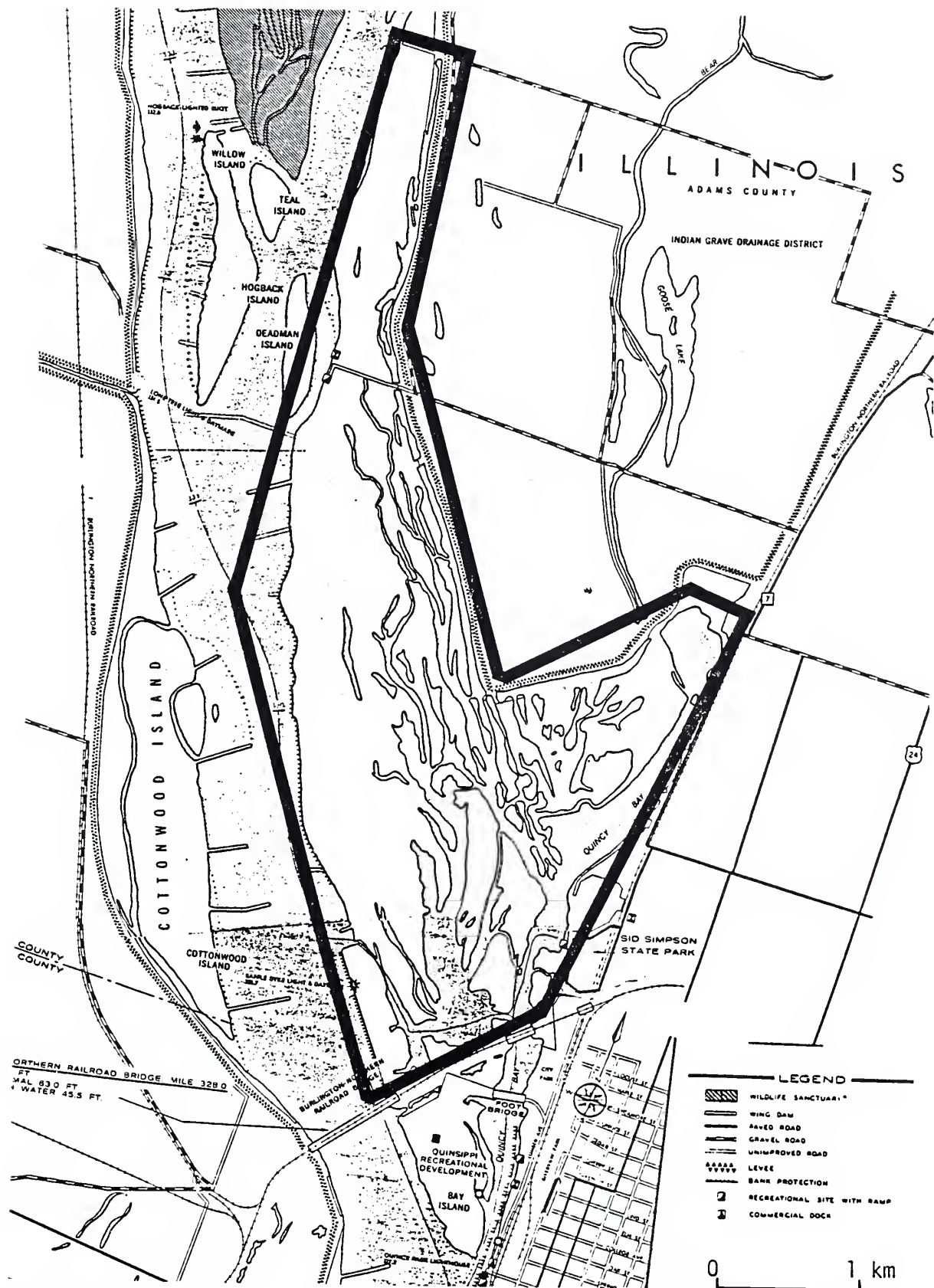


Figure 32. Area # 12: Quincy Bay; Adams County, Illinois; Mississippi River miles: 328.0-332.0.

MANAGEMENT RECOMMENDATIONS:

1. Preserve existing riparian habitats. The entire area is publicly owned, and protected through management by the U.S. Fish and Wildlife Service as part of the Mark Twain National Wildlife Refuge. Due to disturbances associated with recreational uses of a major portion of the area and the large distance to other areas of essential otter habitat, additional enhancement efforts are not recommended at this time. The area would benefit from a build-up of ground along it's western border; this would help prevent flood waters from flowing directly over the area. To build up the border, it could be utilized as a site for dredged material disposal.

Appendix 13. Area # 13: Site specific management recommendations.

AREA NAME: Dogfish, Ligon, and Birch sloughs

STATE: Missouri

COUNTY: Lincoln

LEGAL DESCRIPTION:

SUR 1693, 1732, 1748 T50N R2E

SUR 1693, 1716, 1748 T50N R3E

TOPOGRAPHIC QUADRANGLE: Foley, MO-ILL 7.5
 Hardin, ILL-MO 7.5
 Hardin, ILL-MO 15

LAND OWNERSHIP: Private

Landowners:	Rex Brooksher	Hadley Meyer
	Paul Foster	Howard R. Ross
	Joe Gebauer	Theodore Seifert
	King Lake Subs.	Roy Sharpe
	Mrs. Frank Marre	John H. Stonebreaker
	Lillian Marre	George E. Strunk

OTTER REPORTS: No Recent Reports

SITE DESCRIPTION:

The Dogfish, Ligon, and Birch sloughs area (Figs. 33, 34) lies 127 km (79 miles) by river south of Area 12. It consists of shallow backwater sloughs and ponds surrounded by a levee, which protects it from flood waters of the Mississippi River. The sloughs are stream-fed and inter-connected by ditches. Riparian habitats are bottomland woods, with much of the surrounding area in cropland. Several private hunting resorts are located on the area, and the sloughs receive considerable use during the waterfowl hunting season. The area is enhanced by backwater habitats along the Illinois side of the river (i.e. Batchtown Waterfowl Management Area), which are partially protected by levees.

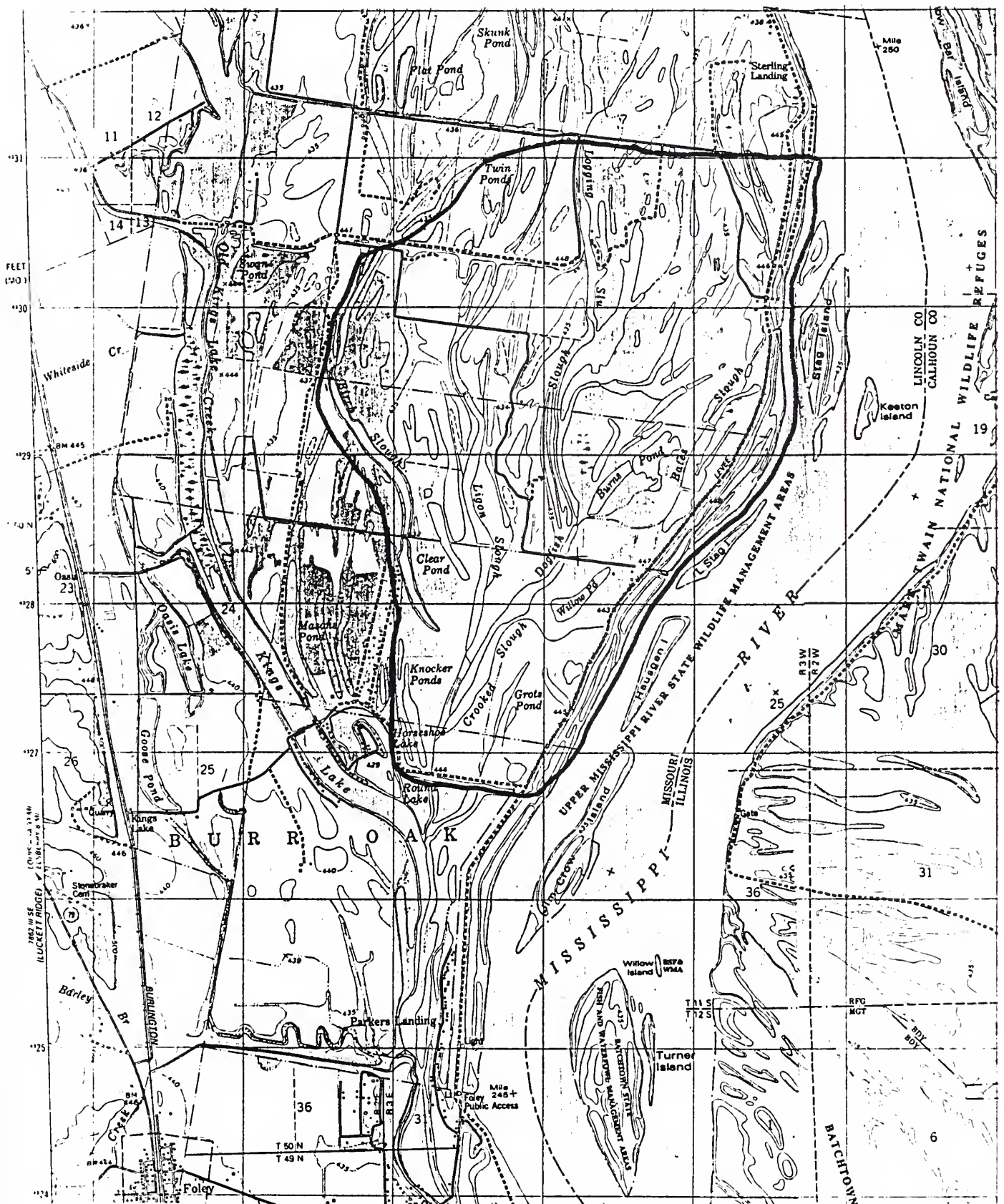


Figure 33. Area # 13: Dogfish, Ligon, and Birch sloughs; Lincoln County, Missouri; Foley 7.5 and Hardin 7.5 Quadrangles.

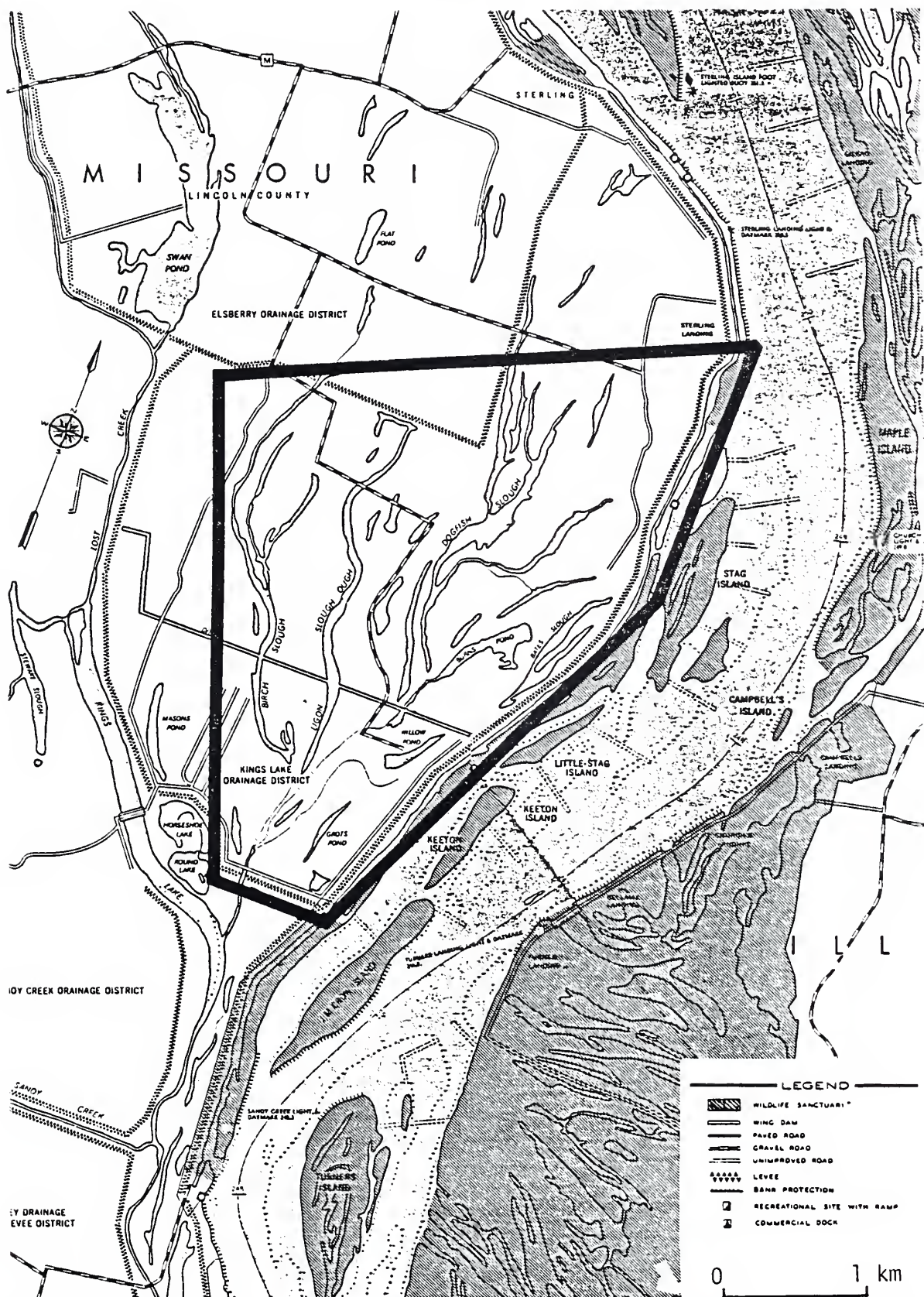


Figure 34. Area # 13; Dogfish, Ligon, and Birch sloughs; Lincoln County, Missouri; Mississippi River miles: 246.2-250.0.

MANAGEMENT RECOMMENDATIONS:

1. Preserve existing riparian habitats. The area has some potential for summer utilization by otters, but is under numerous private ownerships, making protection and management difficult. Due to the large distance to other areas of essential otter habitat, protection of existing habitat is the only management recommendation at this time.

